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Tonnage Piles Up On Mill Books

Incoming Business Exceeds Shipments with Steel Corporation and Other Leading Mills Despite Increased Production—General Operations Now Around 75 Per Cent—40,000 Cars Being Negotiated—Construction Activity Keeps Up

ACCUMULATING tonnage on mill books in the face of increased production marks the breadth and sustained vigor of the steel market. Orders taken by the Steel corporation so far this month have exceeded shipments though it has pushed up its operations to 88 per cent of ingot capacity. Its western subsidiary this week has gone to 90 per cent. Independent production has risen to 70 per cent on the average. For the general industry this represents a gain of 5 to 10 per cent within 30 days.

The volume of new buying remains large. All lines have reflected the expanded activity but the gain in certain materials has been pronounced. Plate business at Chicago is fully 100 per cent greater than a month ago and with eastern mills 50 per cent higher. One large farming implement manufacturer in the West has specified more bars in January than any month in its history. Independent sheet mills report total bookings for December of 349,446 tons representing 132.5 per cent of capacity or more than double those of November and well in excess of any month last year. Recent purchases of automobile steel from Chicago mills are estimated above 100,000 tons.

Filling up of the mills is evidenced by the tendency of deliveries in certain products again to lengthen. Virtually immediate shipment which was obtainable for several months from all producers is being supplanted, especially in steel bars and structural shapes, by promises of not less than three to four weeks by the larger companies.

Many Cars in Sight

More freight cars appear to be under negotiation at present than at any time since the revival of railroad interest first appeared several months ago. Chicago steelmakers sum up the pending list at not less than 40,000 including 10,000 for the Pennsylvania, 10,000 for the New York Central to which 8000 more has just been added, 8000 for the Louisville & Nashville, 5200 for the Santa Fe on which action is expected this week and smaller lots. New orders include 1000 for the Reading and 775 for the Western Fruit Express. The Carnegie Steel Co. will furnish 18,000 tons of steel for 1250 cars taken by American builders for Australia and 7500 tons for Pacific Fruit Express cars. In addition to 57 locomotives placed by the Santa Fe, the New York Central is taking figures on 100.

Awards Are Heavy

Structural steel awards have been running at the highest rate in a year and sufficient new work is appearing from week to week to sustain this record. Reported lettings this week total 52,581 tons, principal among which were 10,000 tons for the municipal repair shop, New York and 7000 tons for the Tribune Tower, Chicago. A bridge at Minneapolis, 7500 tons, is being bid. A Pittsburgh plate fabricator has taken 7700 tons for two gas holders.

Municipalities are putting out some large orders for cast iron pipe. At Chicago cast iron pipe prices are up $2 per ton. New York is in the market for 11,700 tons and Detroit, 11,000 tons.

IRON TRADE REVIEW composite of fourteen leading iron and steel products continues to rise slowly. The week's figure is $43.35 against $43.29 last week.

Iron Prices Higher

The pig iron market reflects more confidence on the part of buyers. At Chicago contracts now are being placed for second quarter at some advance in price. Cleveland furnaces have advanced 50 cents to $24 and have sold some tonnages at that figure. Southern iron is higher and is definitely at a minimum of $22 with some makers asking $23. The recent purchase of 60,000 tons of southern iron by the largest cast iron pipe maker was made from the Tennessee Coal, Iron & Railroad Co. Shipments by merchant furnaces are on the rise and with some producers are running 25 per cent above production.

Effects of the railroad strike are being felt by the British iron and steel industry. A number of furnaces are banked and exporting is being interfered with. French mills have taken 12,000 tons of rails for Brazil and Belgian makers 6000 tons for Chile.

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IRON TRADE REVIEW

Registered U. S. Patent Office

The Authority of Industry *National and International*

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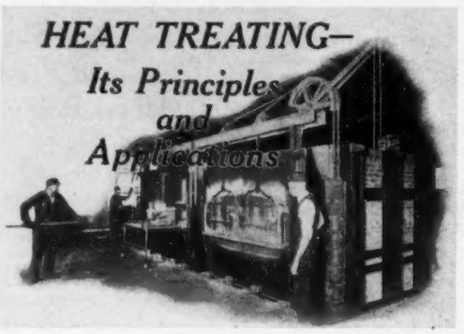

NO SERIES of articles published in IRON TRADE REVIEW since 1914 has attracted more attention than the chapters on heat treating now appearing every second week under the heading reproduced above. Every mail brings requests for back numbers or extra copies containing installments. Hundreds of metallurgists and operating executives are subscribing to IRON TRADE REVIEW in order to obtain these articles.

In view of this manifested interest we are glad to announce that through the courtesy of the authors an extra chapter will be added to the series to cover the design, construction and operation of electric furnaces used for heat treating. This chapter, now in course of preparation, will contain a great amount of hitherto unpublished information based on recent developments.

Chapter V, on normalizing and annealing, begins on page 293 of this issue.

Do You Know That—

When we asked our subscribers what periodicals they read besides IRON TRADE REVIEW, 65 per cent of those replying declared they do not read any other weekly market paper, and 55 per cent stated they do not read any other technical paper.

Pig Iron Continues To Advance

Chicago Market Moves Up to $24 to $24.50, Cleveland to $24; New Gains Registered in Southern District and Elsewhere—Buying Movement for Second Quarter Develops in Middle West—Heavy Shipments from Stocks

PITTSBURGH, Jan. 22.—Small lot purchases rule in the pig iron market, although the Westinghouse Air Brake Co., Wilmerding, Pa., has bought 1750 tons each of malleable, No. 2 and No. 3 foundry iron. It is understood the first two grades went around $21.50, valley basis, the iron coming from a Pennsylvania furnace having a freight rate of $1.39. Valley merchant furnaces have sold several small lots up to 400 tons at $22.50 to $23, for No. 2, the same range as quoted on malleable. Few inquiries are pending. The market for basic iron is unchanged at $21, Johnstown, or $22, valley. The freight rate from both points to Pittsburgh is the same. Large tonnage inquiries are expected to develop this month. Some users are asking that iron bought for February and March delivery be shipped this month. Some open-hearth operators are using 80 instead of 30 per cent pig iron in mixtures because of the present high scrap market. Scrap interests recently inquiring for large tonnages of basic were unsuccessful in developing a repetition of from $19 or $20 prices and have not closed. Bessemer sales have been booked at $23 to $23.50, valley. They range from single carloads up to 250 tons, the latter amount being sold to the Reliance Steel Castings Co. Low phosphorus continues to sell in lots below 500 tons each at $29, valley, and $28, Lebanon, Pa., while the Chateaugay Ore & Iron Co. quoted $27, furnace. One sale of the latter grade is noted here, involving 250 tons of northern iron. The company's furnace at Standish, N. Y., is scheduled to be blown in within two weeks. The Shenango Furnace Co. is scrapping stack No. 4 and operating No. 2. It is not yet ready to blow in No. 3. The Sharpsville Furnace Co.'s tasck has been out of blast since last Thursday.

Buffalo Market More Active

Buffalo, Jan. 22.—The pig iron market shows more inquiry and better selling. Total inquiry is for 8000 to 10,000 tons, including one inquiry for 2200 tons of foundry iron for a pump manufacturer. Two other inquiries each for 1000 tons of mixed foundry and malleable grades, are pending. Sales aggregate 5000 to 6000 tons. Prices range from $22 to $23 for No. 2 plain (1.75 to 2.25 silicon) with 50-cent differentials. Some furnaces are adhering to $23, obtaining this figure on some iron of less than 1.75 per cent silicon but others are willing to take tonnage at $22 to $22.50.

Inquiry Shows Improvement

Boston, Jan. 22.—Pig iron prices in New England still are uncertain, and sales are light. A Massachusetts foundry took several hundred tons of No. 2X iron from an eastern Pennsylvania furnace at $22.50, furnace, or $26.15, delivered. Some sales of Buffalo iron have been made below the generally established market. The bulk of the tonnage of the week, however, has been closed on a basis of $23, eastern Pennsylvania furnace, and $22 Buffalo furnace. Inquiry shows marked improvement especially for second quarter. A Rhode Island melter wants 500 tons. A Connecticut foundry is asking for 500 to 1000 tons of malleable. Another Connecticut consumer wants 500 tons of higher silicon iron. Gilbert & Barker Co. at Springfield, Mass., are about to buy 500 tons. Southern iron has been advanced to $22.50, furnace, and a few car lots have been sold at this figure.

Good Sales Made in East

New York, Jan. 22.—Pig iron trading has broadened considerably. Sales in this territory during the past week amounted to at least 7000 tons. Current inquiry aggregates 10,000 tons and due to the fact that some quiet lots are in prospect, probably more. On business placed during the past week prices have been easier so that the present market may be quoted at $22.50 to $23, base furnace, plus 50 cents silicon differentials. However, anything lower than $23 is exceptional. The Ingersoll Rand Co. is understood to have placed 1000 tons. The Marcy Foundry Co. is reported to have placed 700 tons. A couple of other good tonnages have been closed. The Worthington Pump & Machinery Corp. has replaced old inquiries with a new inquiry, the tonnage aggregating 2615 tons. It is understood the Worthington company has placed some off-grade iron during the past week. The Otis Elevator Co. has not yet taken action on its inquiry for 1200 tons. While the first-hand Buffalo price continues $22, base furnace, some weakness has developed which seems to be largely in connection with resales of Buffalo foundry.

Cleveland Price Up to $24

Cleveland, Jan. 22.—Foundry pig iron No. 2 for delivery in the first quarter has been marked up to $24, base furnace, by Cleveland interests, an advance of 50 cents, and at this price a number of sales have been closed, including one of 2000 tons. The sellers do not seem to be having much difficulty in obtaining the price within the 50-cent switching area of Cleveland. They are quoting $24, furnace, on inquiries outside this territory but so far have not been successful in obtaining any business at that figure. One local interest has refused 500 tons of foundry iron offered at $23, valley, but another merchant interest still quotes $22.50 valley, and continues to book moderate size lots. The same interest quotes $22.50 at other points. Another company in the northern Ohio group is selling at $23 to $23.50, base furnace, and within the week booked around 15,000 tons at these figures, including one of about 6000 tons for a general jobbing foundry interest. Some iron has been taken at $23.50, furnace, for the second quarter, but other sellers refuse to quote on that delivery. In the case of one Cleveland furnace, the price of $24 is quoted only on small lots for prompt shipment. This seller refuses to go beyond the first quarter because of fuel uncertainties. With one maker, sales are averaging 2000 tons a day for all furnaces, at $22.50, furnace, with full differentials. Malleable is being quoted up to $23, valley. The market generally presents strong features, with a good volume of business in moderate size lots. All furnaces report good progress in cleaning up stocks. With one large interest, over 25 per cent of the shipments in January represent tonnage from stock. A furnace interest that reported having inquiries a week ago for more than 50,000 tons of basic has rejected all offers and refuses to quote. One maker has taken some tonnage to be shipped from a western Pennsylvania furnace at a price figuring $22, valley. It is understood a valley interest traded 10,000 tons of basic in a deal for scrap. A report that a northern Ohio steel company closed on a portion of its inquiry for 15,000 tons of basic, is denied by the Cleveland maker which was understood to have made the sale.

Market Continues Strong

Birmingham, Ala., Jan. 21.—The pig iron market in the Birmingham district continues strong. Resumption of operations at the No. 3 furnace of the Woodward Iron Co. will bring an increase of not less than 3500 tons per month. The Sloss-Sheffield Steel & Iron Co. has started preparations on a third furnace. The Alabama Co. will not be able to start a second blast furnace at Gadsden until the latter part of February. It is generally understood the United States Cast Iron Pipe & Foundry Co. has closed for 50,000 to 60,000 ton of iron for delivery during late first and second quarter. The business went to the Tennessee Coal Iron & Railroad Co. Smaller melters are still buying iron and in many instances are asking practically immediate delivery. Three or four pipe shops and foundries will resume operations this week, after being almost completely idle since before the holidays. Small lot sales of iron are at $22 base for No. 2 foundry. One company is asking $22.50 and another is holding out for $23. Some inquiries are being received for second quarter.

Buying for Second Quarter

Chicago, Jan. 22.—Buying of second quarter iron is under way in earnest, with inquiry and sales the heaviest since the buying movement

in November. The foundry melt is increasing and Michigan automobile interests are buying more heavily. Greater confidence in business through the first half is manifested. Sales of 500 to 1000-ton lots are numerous. The market is strong and a general increase to $24.50 is probable shortly. The lowest southern quotation is $22, Birmingham, though most quotations are 50 cents more. Southern sales still are low, owing to the disparity with northern prices. An inquiry for 1000 tons of low phosphorus iron is pending. Sales total 650 tons. Sales of silvery iron total 500 tons. Charcoal iron is firm at $26, furnace, with tity of copper bearing low phosphorus was sold at $28, furnace. No sales of copper-free iron were noted but the English dominate this market. English copper-free low phosphorus can be had now at $27, duty paid tidewater, equivalent to $27.76, delivered Philadelphia consuming plants.

Southern Markets Stronger

Cincinnati, O., Jan. 22.—Inquiry for pig iron continues to increase. Sales in the past week aggregated several thousand tons in carlots. The market for northern and southern iron is stronger. Producers of northern iron are firm at $23, Ironton base, while the southern market ranges from $22.50 to $23, Birmingham base. The $22.50 quotation is that of Rockwood and Woodward furnaces, while Tuscaloosa and the other furnaces are asking $23. It is reported the Alabama Co., Sloss-Sheffield Steel & Iron Co. and the Republic Iron & Steel Co. have withdrawn from the market for first quarter. At least two southern furnaces are understood to be considering business at $22.50. A leading seller reports the sale of 3000 tons of northern iron in separate lots. The Peerless Foundry Co., Cincinnati, bought 500 tons of northern iron, while the Black-Clawson & Co., Hamilton, O., took 300 tons of the same grade. It is reported the Hoosier Iron Works, Kokomo, Ind., closed on its inquiry for 400 tons of low silicon northern iron. A consumer in this district bought 1000 tons of northern iron from a producer in southern Ohio. The Lynchburg Foundry Co., Lynchburg, Va., bought 2000 to 3000 tons of Virginia iron. The Webster Mfg. Co., Tiffin, O., is inquiring for 600 tons.

St. Louis Market More Active

St. Louis, Jan. 22.—Pig iron sales and inquiries are developing in larger volume. The largest single transaction in the week involved 3000 tons of foundry iron for delivery in the first quarter. The same maker sold 200 tons to an Illinois stove builder and 500 tons in car lots. A representative of a Birmingham furnace sold an increase in prospect. Sales are numerous in carloads to 100 tons.

Demand Somewhat Better

Philadelphia, Jan. 22.—Pig iron demand is somewhat better, especially in basic. New inquiries include up to 5000 tons for a Philadelphia consumer and from 300 to 500 tons for a New England consumer. The basic market now is nominal at $22.25 to $22.75, delivered eastern Pennsylvania. Foundry iron demand is somewhat better with several thousand tons booked during the past week. Foundry is now quoted at from $22.50 to $23, base eastern furnace, plus 50-cent silicon differentials in most cases, although the silicon differentials are waived in occasional instances. Some gray forge was sold during the past week at about $22.50, delivered. A fair quan-

Prices Present and Past

Representative market figures yesterday, and for last month, three months ago and one year ago

	Jan. 23, 1924	Dec., 1923	Oct., 1923	Jan., 1923
PIG IRON				
Bessemer, valley del., Pitts.....	$24.77	24.17	27.27	29.27
Basic, valley	22.00	20.50	23.75	25.90
Basic, eastern del., eastern Pa...	23.50	23.30	24.00	27.70
*No. 2 foundry, del. Pitts.....	24.27	23.77	25.17	28.77
*No. 2 foundry, Chicago.....	24.00	23.00	25.60	28.80
*Southern No. 2, Birmingham...	22.50	20.75	20.20	23.30
*Southern Ohio, No. 2, Ironton.	23.00	22.50	23.90	27.90
**No. 2X, Virginia furnace.....	25.50	24.50	25.00	27.50
**No. 2X, eastern del., Phila..	24.26	24.26	24.51	29.56
Malleable, valley	22.50	21.50	23.25	27.25
Malleable, Chicago.....	24.00	23.00	25.60	28.80
Lake Superior charcoal, Chicago	29.04	28.80	30.05	33.15
Gray forge, val. del. Pittsburgh	23.27	23.27	24.52	27.77
Ferromanganese, del., Pitts.....	113.79	113.79	112.79	109.79
SEMIFINISHED MATERIAL				
Sheet bars, bessemer, Pittsburgh.	42.50	42.50	42.50	37.50
Sheet bars, open-hearth, Pitts....	42.50	42.50	42.50	37.50
Billets, bessemer, Pittsburgh.....	40.00	40.35	41.50	37.50
Billets, open-hearth, Pittsburgh..	40.00	40.35	41.50	37.50
FINISHED MATERIAL				
Steel bars, Pittsburgh.....	2.40	2.40	2.40	2.00
Steel bars, Chicago	2.50	2.50	2.50	2.08
Steel bars, Philadelphia	2.72	2.72	2.72	2.385

	Jan. 23, 1924	Dec., 1923	Oct., 1923	Jan., 1923
FINISHED MATERIAL (Continued)				
Iron bars, Philadelphia	$2.62	2.62	2.62	2.365
Iron bars, Chicago mills.....	2.40	2.40	2.40	2.35
Beams, Pittsburgh.....	2.50	2.50	2.50	2.05
Beams, Philadelphia	2.72	2.72	2.72	2.385
Beams, Chicago.....	2.60	2.60	2.60	2.18
Tank plates, Pittsburgh.....	2.50	2.50	2.50	2.05
Tank plates, Philadelphia.....	2.72	2.72	2.72	2.385
Tank plates, Chicago	2.60	2.60	2.60	2.18
Sheets, blk., No. 28, Pittsburgh.	3.75	3.75	3.75	3.35
Sheets, blue anl., No. 10, Pitts.	2.90	2.95	3.00	2.50
Sheets, galv., No. 28, Pittsburgh	4.90	4.90	5.00	4.35
Wire nails, Pittsburgh.....	3.00	3.00	3.00	2.70
COKE				
Connellsville furnace	3.75	3.85	3.85	8.25
Connellsville foundry, ovens.....	4.25	4.80	4.80	9.00
OLD MATERIAL				
Heavy melting steel, Pittsburgh.	22.50	18.35	16.10	21.65
Heavy melting steel, eastern Pa.	18.50	16.80	15.50	19.70
Heavy melting steel, Chicago...	18.50	16.50	14.50	18.70
No. 1 wrought, eastern Pa.....	20.50	19.00	18.00	22.25
No. 1 wrought, Chicago.....	18.50	16.50	15.30	19.40
Rails for rolling, Chicago.....	20.00	17.30	16.25	20.55

*1.75 to 2.25 silicon. **2.25 to 2.75 silicon.

Composite Market Average

Representing the Combined Average Prices Per Ton of Fourteen Leading Iron and Steel Products Yesterday, One Week, One Month, Three Months, One Year and Ten Years Ago.

Jan. 23, 1924	Jan. 16, 1924	Dec., 1923	Oct., 1923	Jan., 1923	Jan., 1914
$43.35	$43.29	$43.02	$43.84	$41.17	$23.03

Products Included Are Pig Iron, Billets, Slabs, Sheet Bars, Wire Rods, Steel Bars, Plates, Structural Shapes, Black, Galvanized and Blue Annealed Sheets, Tin Plate, Wire Nails and Black Pipe

a total of 3700 tons, including one lot of 1000 tons, all within this district, for first half. Other sales reported amount to about 2400 tons. An inquiry is pending from an Illinois radiator maker for 600 to 1000 tons, and a stove builder is asking for prices on 500 tons. Prices show strength. While the southern base grade still is obtainable at $22, two important Alabama interests have advanced their quotation to $23. Chicago has moved up to $24 and offerings from that direction are less abundant. The leading local producer's price is firm at $24 to $25 f.o.b. Granite City. Reports of selling agencies here indicate a growing scarcity of special grades Some stove foundries have started up, and it is likely that all will become active again by the first week in February.

Iron and Steel Prices

SCRAP PRICES, PAGE 314, WAREHOUSE PAGE 310, ORE, NUTS, BOLTS AND RIVETS AND PIPE PRICES, PAGE 312

Pig Iron

Prices per gross ton

Bessemer, valley	$23.00
Bessemer, Pittsburgh	24.77
Basic, valley	21.00 to 22.00
Basic, Pittsburgh	22.77 to 23.77
Basic, Buffalo	23.00
Basic, del., eastern Pa.	22.26 to 22.76
Malleable, valley	22.00 to 22.50
Malleable, Pittsburgh	21.77 to 24.77
Malleable, Chicago	24.00 to 24.50
Malleable, Buffalo	23.00 to 23.50
Malleable, del., eastern Pa.	24.00 to 25.00

FOUNDRY IRON SILICONS

No. 2 Northern	1.75 to 2.25
No. 2 Southern foundry	1.75 to 2.25
No. 2X East'n and Virginia	2.25 to 2.75
No. 1X Eastern	2.75 to 3.25
No. 1 Chicago	2.25 to 2.75
No. 2 foundry Eastern	1.75 to 2.25

No. 1X, eastern del., Phila.	24.76
No. 1X, Buffalo	24.00 to 25.00
No. 2 foundry, valley	22.50
No. 2 foundry, Pittsburgh	24.27
No. 2 foundry, Buffalo	23.00
No. 2 foundry, Chicago	24.00 to 24.50
No. 2 foundry, Granite City	24.00 to 25.00
No. 2 foundry, Ironton furnace	23.00
No. 2 foundry, Cleveland, del.	24.50
No. 2 foundry, del., Phila.	23.76
No. 2 foundry, N. J. tidewater	24.13
No. 2X, eastern del., Phila.	24.26
No. 2X, east, N. J. tidewater	24.63
No. 2X, eastern del., Boston	26.65 to 27.65
No. 2X foundry, Buffalo fur.	23.50 to 24.00
No. 2X, Buffalo, del. Boston	26.92 to 27.92
No. 2 southern, Birmingham	22.50t o 23.00
No. 2 southern, Cincinnati	26.05 to 27.05
No. 2 southern, Chicago	28.01 to 29.01
No. 2 southern, Philadelphia	29.80 to 30.80
No. 2 southern, Cleveland	28.01 to 29.01
No. 2 southern, Boston (rail and water)	28.91 to 29.91
No. 2 southern, St. Louis	27.17 to 28.17
No. 2X, Virginia furnace	25.00 to 25.50
No. 2X, Virginia, Phila.	29.77 to 30.27
No. 2X, Virginia, Jersey City	30.04 to 30.54
No. 2X, Virginia, Boston	30.92 to 31.42
Gray forge, eastern Pa.	22.00
Gray forge, val. del., Pitts.	23.27 to 23.77
Low phos., standard, valley	29.00
Low phos., standard, Phila.	nominal
Low phos., Lebanon, furnace	28.00
Charcoal, Birmingham	32.00 to 33.00
Charcoal, Superior, Chicago	29.04

Silvery Iron

Jackson County, Ohio, furnace

7 to 8 per cent	31.00
8 to 9 per cent	32.50
9 to 10 per cent	34.50
10 to 11 per cent	36.50
11 to 12 per cent	39.00
12 per cent	41.50

Bessemer Ferrosilicon

Jackson County, Ohio, furnace

10 to 11 per cent	41.50
11 to 12 per cent	44.00
12 to 13 per cent	46.50

Ferroalloys

†Ferromanganese 78 to 82 per cent, tidewater, or furnace first hand and resale	$109.00 to 110.00
Ferromanganese, delivered, Pittsburgh	113.79 to 114.79
Spiegeleisen 19 to 21 per cent furnace or tidewater	38.00 to 40.00
Ferrosilicon, 50 per cent contract freight allowed	75.00
Ferrotungsten standard, cents per pound contained	85.00 to 90.00
Ferrochrome, 60 to 70 chromium, 6 to 8 carbon, cents per pound contained, delivered	10.00 to 10.25
Ferrovanadium, 30 to 40 per cent per pound estimated, according to analysis	$3.50 to $4.00
Ferro carbon-titanium, carloads, producer's plant, per net ton	$200.00

†Duty paid.

Coke

Beehive, Ovens

Prices per net ton

Connellsville furnace	$3.75 to 4.25
Connellsville foundry	4.75 to 5.50
New River foundry	11.00 to 11.50
Wise county furnace	5.00 to 5.75
Wise county foundry	5.75 to 6.50
Alabama furnace	5.00 to 6.00
Alabama foundry	5.50 to 6.50

By-Product

Foundry, Newark, N. J., del.	$10.91
Foundry, Chicago, ovens	12.50
Foundry, Boston, delivered	12.50
Foundry, St. Louis	12.50
Foundry, Granite City, Ill.	12.50
Foundry, Alabama	5.00 to 6.50

Semifinished Material

Prices per gross ton

BILLETS AND BLOOMS

4 x 4-inch base

Open-hearth, Pittsburgh	$40.00
Open-hearth, Youngstown	40.00
Open-hearth, Philadelphia	45.17
Bessemer, Pittsburgh	40.00
Bessemer, Youngstown	40.00
Forging, Pittsburgh	45.00
Forging, Philadelphia	50.17

SHEET BARS

Open-hearth, Pittsburgh	$42.50
Open-hearth, Youngstown	42.50
Bessemer, Pittsburgh	42.50
Bessemer, Youngstown	42.50

SLABS

Pittsburgh	$40.00
Youngstown	40.00

WIRE RODS

¼-inch and finer

Wire rods, Pittsburgh $51.00

Standard extras, $2.50 per ton over ¼-inch; $5 for screw stock; $15 for acid wire rods. Carbon extras, $3 for 0.20 to 0.40; $5 for 0.41 to 0.55; $7.50 for 0.56 to 0.75; $10 over 0.75.

SKELP

Grooved skelp, Pittsburgh	2.35c to 2.40c
Universal skelp, Pittsburgh	2.35c to 2.40c
Sheared skelp, Pittsburgh	2.35c to 2.40c

Shapes, Plates and Bars

Prices per pound

Structural shapes, Pittsburgh	2.50c
Structural shapes, Phila.	2.67c to 2.82c
Structural shapes, New York	2.69c to 2.84c
Structural shapes, Chicago	2.60c
Tank plates, Pittsburgh	2.50c
Tank plates, Philadelphia	2.67c to 2.82c
Tank plates, New York	2.69c to 2.84c
Tank plates, Chicago	2.60c
Bars, soft steel, Pittsburgh	2.40c
Bars for cold finishing, Pitts.	2.55c
Bars, soft steel, Philadelphia	2.72c
Bars, soft steel, New York	2.74c
Bars, soft steel, Chicago	2.50c
Bars, refined iron, Pittsburgh	3.25c to 5.00c
Bars, rail steel, Chicago	2.30c to 2.33c
Bars, rail steel, mill	2.10c to 2.20c
Reinforcing bars, billet, Pitts.	2.40c
Bar iron, common, Phila.	2.62c to 2.67c
Bar iron, common, New York	2.64c to 2.69c
Bar iron, common, Chicago	2.40c
Bars, forging quality, Pitts.	2.65c

Hoops, Bands, Shafting

Prices per pound

Hoops, Pittsburgh, under 5 in.	3.00c
Hoops, Pittsburgh, 20 gage, under 1 in.	3.35c to 3.50c
Bands, Pittsburgh	3.00c
Cold finished steel bars, Pittsburgh base	3.00c
Steel shafting, Pittsburgh	3.00c
Cotton ties, bundle 45 lb. Pittsburgh	$1.67

Rails, Track Material

Standard bessemer rails, mill	$43.00
Standard open-hearth rails, mill	43.00
Relaying rails, St. Louis	27.00 to 32.50
Relaying rails, Pittsburgh	30.00 to 34.00
Light rails, 25 to 45, mill	2.15c to 2.25c
Angle bars, Chicago base	2.75c
Spikes, railroad, Pittsburgh	3.05c to 3.15c
Spikes, small railroad, Pitts.	3.40c to 3.50c
Spikes, boat and barge, Pitts.	3.50c
Spikes, railroad, Chicago	3.10c
Track bolts, Pitts. Standard	4.00c
Track bolts, Pitts., small	4.75c to 5.00c
Track bolts, Chicago	4.10c
Tie plates, Pittsburgh	2.55c to 2.60c
Tie plates, Chicago	2.60c

Spike, tie plate and truck bolt prices for carlots.

Wire Products

To Jobbers in Carloads

Prices per pound

Wire nails, Pittsburgh	3.00c
Galv'd nails, 1-inch and over	5.25c
Plain wire, Pittsburgh	2.75c
Annealed wire, Pittsburgh	2.90c
Galvanized wire, No. 9 gage, Pittsburgh	3.35c
Barbed wire, painted, Pitts.	3.45c
Barbed wire, galv., Pitts.	3.80c
Polished staples, Pittsburgh	3.45c
Galvanized staples, Pittsburgh	3.80c
Coated nails, count keg, Pittsburgh	2.70c
Woven wire fencing (retailers)	65 off
Woven wire fencing (jobbers)	67½ off

Chain, Piling, Strip Steel

Prices per pound

Chain, 1-in. proof coil, Pitts.	6.00c
Sheet piling base, Pittsburgh	2.55c
Hot rolled strip steel, Pittsburg stamping quality	3.00c
Cold rolled strip steel, hard coils, 1½ inches and wider by 0.100-inch and heavier, 0.100-inch and heavier, base	5.00c

Sheets

SHEET MILL BLACK

Prices per pound

No. 28, open-hearth, Pitts.	3.75c to 3.85c
No. 28, bessemer, Pitts.	3.75c to 3.85c
No. 28, open-hearth, Phila.	4.02c to 4.17c
No. 28, open-hearth, Chicago	4.09c to 4.19c

TIN MILL, BLACK

No. 28, open-hearth, Pitts.	3.75c to 3.85c

GALVANIZED

No. 28, open-hearth, Pitts.	4.90c to 5.00c
No. 28 bessemer, Pittsburgh	4.90c to 5.00c
No. 28, open-hearth, Phila.	5.22c to 5.32c
No. 28, open-hearth, Chicago	5.19c to 5.34c

BLUE ANNEALED

No. 10, open hearth, Pitts.	2.90c to 3.00c
No. 10 bessemer, Pittsburgh	2.90c to 3.00c
No. 10, open-hearth, Phila.	3.32c
No. 10, open-hearth, Chicago	3.34c

AUTOMOBILE SHEETS

No. 22 Pittsburgh	5.35c

Tin Plate

Prices per 100-pound box

Tin plate, coke base, Pitts.	$5.50

Iron and Steel Pipe

Base Discounts Pittsburgh to Jobbers in Carloads

	Black	Galv.
1 to 3-inch, butt steel	62	50½
1 to 1½-inch, butt iron	30	13

Boiler Tubes

Less Carload Discounts—Carloads 4 Points Additional

Steel 3¼ to 3¾-inch	38½
Charcoal iron, 3¼ to 4½-inch	5
Seamless hot rolled, 3½ to 3¾-inch	35

Cast Iron Water Pipe

Prices per net ton

Class B Pipe

Four-inch, Chicago	$61.20 to 62.20
Six-inch and over, Chicago	57.20 to 58.20
Four-inch, Birmingham	51.00 to 52.00
Six-inch and over, Birmingham	47.00 to 48.00
Four-inch, New York	65.60 to 66.60
Six-inch and over, New York	60.60 to 61.60
Standard fittings, Birmingham, base	$110.00

6 to 24-inch, base; over 24-inch, plus $20; 4-inch, plus $20; 3-inch, plus $20; gas pipe fittings, $5 higher.

Class A pipe is $5 higher than Class B.

Scrap Advance Is Steady

Strong Situation in All Centers with Dealers Holding Stocks and Offerings from Producers Relatively Light—Steel Is Higher

SCRAP PRICES, PAGE 314

Chicago, Jan. 22.—With pig iron strong, scrap prices advancing constantly to to the East, railroad offerings light and cold weather delaying deliveries, iron and steel scrap prices in Chicago naturally have reacted to those conditions and advanced. Illinois Steel Co. is understood to have bought a round tonnage for its Gary works at a price is rumored at $18.50 to $20 and the tonnage from 12,000 to 25,000 tons. About 1000 tons of heavy melting steel has been shipped East on a basis of $18.50 tracks, Chicago. Five hundred tons are reported sold here on the basis of $19.25, delivered. Dealers say every indication points to $20 melting steel and the quotation today is $18.50 to $19. Low phosphorus grades are soaring and it is reported American Steel Foundries will be in the market shortly. Rerolling rails are up $1.50 and are hard to get. Some dealers expect heavy demand for this grade. Rolling mill grades are slow but prospects for foundry grades are improving. Delivery of scrap has been greatly retarded by sub-zero temperatures. Inland Steel Co. has not yet bought but dealers believe it will do so soon. George W. Jenings is offering 1200 tons of scrap.

Prices Advance Sharply

Boston, Jan. 22.—Nearly all grades of iron and steel scrap have advanced during the past week. Steel mill grades are in strong demand with prices up a dollar in most cases. Several eastern Pennsylvania steel works are in the market for borings and turnings and $11 per gross ton on cars New England shipping point was the price in a recent sale of 200 tons. Even cast grades show considerable strength. A Massachusetts foundry bought No. 1 machinery at $23 delivered. Strictly textile scrap is held at $23.50 and one dealer has quoted $24 delivered for shipment into Connecticut. Several attractive orders for delivery to Steel corporation works are in the hands of local dealers and these have made it possible for heavy melting steel to sell as high as $15 per gross ton on cars shipping point.

Steel Lower in East

New York, Jan. 22.—While some grades of iron and steel scrap have advanced the market on heavy melting and No. 1 railroad steel has received a setback. Where dealers recently were quoting $18, delivered eastern consuming points, they were unable to sell the leading interests at more than $17.50, delivered, and no dealer is now offering to buy at more than that price delivered, and in at least one instance a lower price has been offered. However, colder weather may result in difficult handling of scrap, with accompanying higher prices.

Recent advances affect steel car axles, now holding at $17 to $17.50, New York; rerolling rails, $16.25 to $16.75; old steel shafting, $15.75 to $16.25; city wrought, $14.50 to $15; and railroad wrought, $16 to $17. Clean cast borings and turnings are being purchased for shipment to Harrisburg and Phoenixville, Pa., at $14.50 to $15, delivered. Mixed borings and turnings are going to Bethlehem, Pa., at $12.50, delivered, and to some points in western Pennsylvania at as high as $17, delivered.

Considerable interest here is being centered in the opening of bids tomorrow at Philadelphia on 53,000 tons of government scrap from three battleships, includes 25,000 tons of steel, pipe and other miscellaneous material and 11,000 tons of armor plate. Seven hundred tons of nonferrous scrap is also included.

Demand Good at Buffalo

Buffalo, Jan. 22.—One of three large inquiries for heavy melting steel which have been out in this territory for some time, has been closed. The Gould Coupler Co. has purchased about 2000 tons at about $21, it is reported. Buffalo steel is going into Youngstown and Pittsburgh, where $23 is being realized. Hydraulic compressed sheets from this territory is bringing $20.50 and $21, Youngstown. Turnings, borings and specialty scrap are in good

(*Concluded on Page 273*)

Steel Needs Are Covered

New Demand for Semifinished Material Is Small—Prices Firm—Makers Using More of Their Own Supplies of Wire Rods

SEMIFINISHED STEEL PRICES, PAGE 261

Youngstown, O., Jan. 22.—Sheet producers depending upon mills in this district for their supply of sheet bars are specifying up to maximum quantity. Some of them are pressing for delivery. Buyers in the open market are manifesting more interest in lining up tonnage of sheet bars, but as one producer here is out of the market for first quarter only one source of supply remains where inquiry will be considered. Quotations are firm at $42.50, Youngstown, on sheet bars. Billets and slabs may be had on contract at $40. Rivet makers are booking more business than was anticipated when they placed their first quarter contracts for rods and in some cases are buying additional tonnages. Producers here are quoting $51, Pittsburgh on rods.

Billet Prices Firm

Philadelphia, Jan. 22.—Current billet business is small, though the market is firm. Rerolling billets are held at $40, Pittsburgh, and forging quality at $45.

Good Inquiries at Buffalo

Buffalo, Jan. 22.—Good inquiries are coming out for sheet bars and billets and business is fair. The market is firm at $42.50, Pittsburgh, for sheet bars, and $40, Pittsburgh, for billets.

Most Users Well Covered

Pittsburgh, Jan. 22.—While large users of semifinished material, particularly sheet bars, billets and slabs, have covered their requirements for the quarter, orders continue to drift in for round tonnages. During the past few days additional orders have been received by one producer for 4000 tons of sheet bars and slabs. Sheet bars are firm at $42 50, while the 4 x 4-inch rerolling billets and slabs are unchanged at $40, base Pittsburgh. Although specifications on forging billets have been small during the past two weeks, all users of forging billets have placed contracts so that little activity is noted in the open market. These were taken at $45, base Pittsburgh. Additional sales of wire rods have been made at $51, Pittsburgh. The supply is more restricted since a larger tonnage is needed by makers in their own departments. This is true of the Bethlehem Steel Co. although it has been able to take on several of its old wire rod customers. The skelp market is quiet, practically nothing being noted in the way of new orders, and while the usual price is 2.40c, some tonnage is understood to be available at 2.35c, base Pittsburgh.

Special Grades Booked

Cleveland, Jan. 22.—In the semifinished steel market some small tonnages of steel requiring special treatment have been taken by the leading maker in this district. The regular output of sheet bars, billets and slabs have been contracted for throughout the first quarter. Sheet bars generally are held at $42.50, Youngstown, and billets and slabs at $40, though no additional business has been taken, as users depending on this source are covered.

More Ferro Orders

Many Consumers Cover On Ferromanganese—Ferrophosphorus Is Sold to

FERROALLOY PRICES, PAGE 261

Pittsburgh, Jan. 22.—More orders for ferromanganese are being placed each week on the books of domestic makers. This constitutes the major portion of activity in the ferroalloy market. As indicated last week, English sellers too, have lately been successful in booking a few orders up to 1000 tons each. The past week several more orders were placed with domestic makers at $109, seaboard base. Some consumers have commenced to cover on second quarter requirements. E. J. Lavino & Co has another furnace ready to be blown in on ferromanganese production when such action is justified. Recent orders taken for imported material are understood to include one for 500 to 800 tons from the Pittsburgh Steel Co., and one for 1000 tons from the Central Steel Co. A list of buyers of domestic material placing

orders in recent weeks would include practically all of the steel producers and steel foundry interests in the Pittsburgh and Chicago territories, except possibly one user in the Wheeling, W. Va., and one in the St. Louis districts. Some middle interests have had difficulty covering some short orders taken at below $109 base. Reports of concessions on 50 per cent ferrosilicon are being spread but sellers are well committed at $75, freight allowed, and are not inclined to endanger those contracts. Few consumers now are in the market for this or other alloys. Spiegeleisen is unchanged both in price and demand.

Spiegel Sales Are Made

New York, Jan. 22.—Approximately 1000 tons of spiegeleisen for prompt and February shipment have been sold during the past week. The market continues $38 to $40 furnace for 20 per cent metal. Further inquiry is pending. A fair amount of ferromanganese business continues to be entered mostly for nearby shipment. The price on English ferromanganese continues $110 duty paid tidewater, while domestic metal continues $109 duty paid tidewater.

A fair business is being transacted in ferrophosphorus for export to England. The price being done is $105 Tennessee furnace for the metal packed in barrels. This is on the basis of 20 per cent metal, and a unitage differential of $2.00 is employed in quoting the prices on the export material, which ranges from 17 to 21 per cent.

Tin Plate Needed

Users Taking Full Quota and Makers Keep Production at High Point

TIN PLATE PRICES, PAGE 261

Pittsburgh, Jan. 22.—Production and shipments of tin plate are on a sustained high plane in harmony with heavy bookings ruling for several months. The general average is around 90 or 95 per cent of capacity with the American Sheet & Tin Plate Co. still able to maintain 97 per cent as a rule. It does not expect to exceed that figure. Little is developing in the way of new demand most can makers having fully obligated themselves to April 1 and some having supplied their wants as far ahead as July 1. On a great deal of this tonnage specifications have not been received. So far as can be learned the only departure from $5.50 base Pittsburgh is in connection with material for export where a freight rebate permits of concessions.

Plan Annual Convention

Commencing Monday, May 5, and continuing through that week, the second annual convention of sheet steel executives will be held at Hotel Greenbrier, White Sulphur Springs, W. Va., under the auspices of the National Association of Sheet and Tin Plate Manufacturers. President W. S. Horner of that organization is general chairman, and other committee appointments are now being accepted.

A feature of this meeting will be in regard to the proposed advertising campaign, particularly with reference to galvanized sheets contemplated by the National Association of Sheet and Tin Plate Manufacturers.

Contract for Furnace Coke

Several Interests Close on First Quarter Requirements at $4 to $4.25 —Spot Sales More Frequent—Foundries Specifying Regularly

COKE RICES, PAGE 261

Pittsburgh, Jan. 22.—Contracts for Connellsville beehive furnace coke for the Hubbard, O., furnaces of the Youngstown Sheet & Tube Co. for the remainder of the first quarter feature the market. These are reported taken at $4.25 by two producing interests. The purchase was necessary as the buyer now is furnishing by-product coke to a nearby merchant furnace interest. One or two other contracts have been taken at $4, Connellsville. One involves 5000 tons of furnace coke monthly for the first quarter, another 10,000 tons for February only. The Rogers, Brown Iron Co. is included among recent purchasers. The Nortern Iron Co., Standish, N. Y., will blow in its furnace in the next two weeks. Spot sales of standard 48-hour fuel are more plentiful. The majority are at $4. Others are as low as $3.75. Some producers are quoting $4.40, minimum. Others are naming $4.50. Second quarter tonnage inquiries are beginning to appear. The A. M. Byers Co. and a few others are inquiring for second quarter supplies. Heating coke is slightly more active in small lots. Practically no large tonnages are up for consideration. Foundry coke demand is intermittent, most users having covered their requirements. They are specifying regularly. Others are buying carloads at a time. Prices are running all the way from $4.75 to $5.50. Production of Connellsville coke, according to the *Connellsville Courier*, for the week ended Jan. 12 was 192,050 tons compared with 186,810 tons in the preceding week.

Spot Buying Increased

New York, Jan. 22.—Buying of spot foundry coke has increased in volume, but does not show any real activity. The market on spot foundry coke continues $5 to $5.25, Connel'sville. On by-product foundry coke the market still is $10.91, delivered at Newark and other northern New Jersey consuming points.

Foundry Sales Increase

Cincinnati, Jan. 22.—Foundry coke sales continue to increase in volume, while demand for furnace fuel is lacking. Wise county trade is better than for several weeks, while producers in the New River district are not eager to accept business for shipment after April 1, because of the uncertainty of labor conditions. Eaton, Rhodes & Co., have announced that the price of its solway by-product coke would remain at $8, Connellsville base, for February shipment. Metallurgical users are purchasing more freely. Demand for Connellsville foundry coke has subsided. Quotations range from $6.50 to $8, ovens.

Limit Buying to Current Needs

St. Louis, Jan. 22.—Business in the coke market is limited almost entirely to domestic grades. No change is reported in the industrial coke situation. A few contracts have been placed but the general disposition is to buy for current needs only. The cold weather has created a good demand for coal and prices are stronger

Southern Foundry $5 to $6.50

Birmingham, Ala., Jan. 22.—The coke market in the Birmingham district has been improving slightly. Production has not been increased. By-product foundry coke is held at $5, ranging up to $6.50. The coal market is quiet. Stocks may be accumulated before April 1, though it is not believed a strike will take place in the central bituminous field.

Buying from Warehouses Shows Increase

WAREHOUSE PRICES, PAGE 310

New York, Jan. 22.—Demand for iron and steel out of warehouse is unusually active for this season of the year, with a heavy movement in shapes and reinforcing bars, due to the continued open building season. Prices are strong with an upward tendency in galvanized sheets. At present the market on this grade is 5.50c, but with a 5.00c, Pittsburgh, price being quoted at the mills and a good outlook ahead in this description, higher warehouse prices are expected to develop shortly. One leading seller in this district is expected to increase his prices to 5.75c, New York, within the coming week. Strength of mill prices and relatively low figures quoted by some local jobbers have caused others here to be virtually out of the market. One interest has been quoting 6.00c, and booking such small business as come his way at that figure. The only exception to the general strength of prices is found in welded pipe, the discounts being shaded in some instances.

Prospects More Cheerful

Philadelphia, Jan. 22.—Iron and steel jobbers report continued demand for materials out of warehouses at about 60 per cent of normal. Indications point to improvement this spring.

January Sales Increase

Cleveland, Jan. 22.—Sales of iron and steel products from warehouses have increased over the December level, as expected, with further gains anticipated. Buying remains largely on a hand-to-mouth basis, although many metalworking shops are laying in stocks for spring needs. Price cutting continues to be noted on attractive tonnages of material out of stock, but general warehouse prices firmly are maintained. Prices on bands have stiffened.

Business Is Broadening

Detroit, Jan. 22.—Business by jobbers in iron and steel products has broadened during the week. Prices on all grades of material are holding steady. Bars and bands continue in better demand than they were before the holiday season. Structural shapes are in small demand since the cold weather arrived. Dealers are cheerfull over the outlook for increased business.

Bar Demand Holds Steady

All Consumers Taking Better Tonnage Since Inventory Ended—Automotive Builders Active and Specifying More Fully for Spring Program

BAR PRICES, PAGE 261

Pittsburgh, Jan. 22.—More momentum has been gained in the merchant steel bar market in that specifications, particularly from jobbers, are more numerous. Some of this buying is being conducted by customers who have not been active purchasers for several months. Numerous jobbers are ordering single carloads or 100 tons or more at a time. Several producers have taken orders totaling 300 or 350 tons daily. Occasionally a larger individual tonnage is placed and merchant steel bar output for first quarter is being well covered. The market is unchanged at 2.40c base Pittsburgh.

Decided improvement has come to the refined iron bar market. Individual orders are growing larger and buyers are more numerous. Prices are a trifle stronger at a minimum of 3.25c, base Pittsburgh.

Manufacturers Want Bars

Boston, Jan. 22.—New England manufacturers are inquiring for bars more generously than in many months. One of the principal sellers finds business so far in January at a higher rate than for any month in 1923.

Demands Holds Steady

New York, Jan. 22.—Steel bar demand while not featured by particularly large orders continues steady and appears to be at about 70 per cent of capacity. The price continues firmly maintained by the large mills at 2.40c base Pittsburgh.

Deliveries Are Falling Back

Cleveland, Jan. 22.—Deliveries on steel bars are not so promptly obtainable as a result of the recent increase of bookings by the mills. Where heretofore promises of shipment could be made within a few days, the mill schedules of producers now will not permit business to be accepted for immediate shipment. With some mills, on any considerable assortment of sizes, deliveries are quoted at not less than 30 days. In spring steel especially mill capacity is booked for some period ahead as a result of recent buying by interests identified with the automotive field. Now these continue to be taken by producers in increased volume and specifications are being passed to the mills in constantly larger tonnage. Agricultural implement interests in this territory which have been buying in a heavier way are negotiating for further tonnage. Steel bar prices are well maintained at 2.40c, Pittsburgh.

Heavy Automotive Buying

Chicago, Jan. 22.—Activity in soft steel bars continues marked. Bookings of one maker in the first half of January were almost double the corresponding period of December, exclusive of tonnage reserved but not yet actually placed on the books. One large agricultural implement manufacturer has specified more bars this month than in any month in its history. The leading maker estimates business last week heavier than any week since last May. This business comes from all classes of consumers. Warehouses again are buying freely. Automotive interests have become large factors, one maker estimating recent automotive buying of all classes of steel in the territory at upwards of 100,000 tons. In view of the fact there is no talk of price advance, makers believe heavy buying represents actual requirements. The soft steel bar price continues 2.50c, Chicago.

In rail steel bars the improvement is decided, and most mills have appreciably extended their backlogs. This industry can stand much improvement. The price of rail steel bars is still 2.30c, mill, or 2.30c to 2.33c, Chicago.

Makers of bar iron are talking of an advance in their price of 2.40c, Chicago. They point out that low-priced scrap is being exhausted and replacement is possible only at advanced quotations. Most mills are continuing one turn.

Cold Drawn Bars Active

Pittsburgh, Jan. 22.—Activity of cold drawn steel bar consumers is denoted by increased buying and continuation of heavy specifications. Makers find while the automotive industry has held the leading position among consumers and still does, other users are active, particularly machine tool manufacturers, and in the past week splendid specifications have come from eastern machine tool manufacturers. The price is firm at 3.00c base Pittsburgh pending the adoption of a new classification of extras which will take into account the 2.55c price now quoted on bars for cold finishing by makers of merchant steel bars.

Bolts, Nuts, Rivets in Better Demand

NUT AND BOLT PRICES, PAGE 312

Chicago, Jan. 22.—Demand for bolts and nuts continues at the high rate that has prevailed the past few weeks. One or two plants still could take on more business but most makers are satisfied. In the past week buying by implement makers has decreased slightly. This has been more than offset by the increased buying by automotive interests. The Ford Motor Co. has placed its requirements for February. Prices are holding firm on all classifications on the basis of 60 and 10 off.

Railroads Buying Well

Pittsburgh, Jan. 22.—Since jobbers are fairly well booked most buying of nuts, bolts and rivets has been conducted by large users among manufacturers and such other interests as railroads. An increasing number of carload orders has been noted in the past two or three weeks, as users are ready to replace their stocks. Prices on nuts and bolts are fairly firm, more so than on rivets. In connection with the latter, some departure from 2.90c base Pittsburgh has been made in connection with attractive carload specifications, and one or two contracts have been extended on the basis of 2.75c, Pittsburgh. The discount on small rivets is unchanged, 65, 10 and 5 off. Specifications on rivet contracts since the first of the year have dwindled considerably.

January Unusually Good Month

Philadelphia, Jan. 22.—Bolt and nut demand continues good, with most business being specifications on contracts. January promises to be the heaviest month in a long time. Rivet demand is fairly good. Prices in general continue firmer than usual.

Less New Hoop Buying

HOOP PRICES, PAGE 261

Pittsburgh, Jan. 22.—Shipments on backlogs of hoops and bands are heavy and while new buying has been somewhat reduced specifications continue liberally. Standard hoops and bands are 3.00c, base Pittsburgh, up to 3.50c, base Pittsburgh, being quoted on narrow hoops of thin gages.

Strip Output Obligated

STRIP PRICES, PAGE 261

Pittsburgh, Jan. 22.—With the greater portion, if not all of their output committed for the first quarter, hot and cold-rolled strip steel producers occupy a favorable position from an operating standpoint. One maker which recently increased its capacity has all of its old capacity obligated for the entire first quarter, together with 25 to 50 per cent of the recently added capacity. Different consuming lines are represented in these specifications being received which are coming in from over a widespread territory. Prices are firm at 3.00c and 5.00c base Pittsburgh, for hot and cold strips, respectively.

Manganese Ore Higher

New York, Jan. 22.—Prices on Caucasian manganese ore were advanced today. The new asking figures are 46 cents per unit, c.i.f. tidewater for washed ore, containing 53 to 55 per cent manganese, and 43 cents for ordinary ore containing 48 to 49 per cent manganese. The first quotation on Brazilian ore named in some time is 42 cents per unit, c.i.f. tidewater, for second half shipment. No quotations have been made recently on Indian manganese ore.

Foundrymen Elect

Chicago, Jan. 22.—Eugene M. Smith, superintendent of foundries for the Crane Co., a former president, was elected president of the Chicago Foundrymen's club at its meeting Jan. 19. G. P. Fisher of the Whiting Corp. was elected vice president and G. L. Lacher of the *Iron Age*, secretary-treasurer. Directors elected for two years were James A. Murphy of the Wolff Mfg. Co., Charles L. Larson of Armour institute, Carl M. Pearson, Pickards, Brown & Co., and J. H. Hopp of the Charles C. Kawin Co. The club also appointed J. H. Hopp of the Charles C.

Kawin Co., its representative to co-operate with the joint committee on molding sand acting for the American Foundrymen's association and the National Research council.

May Modify Daugherty Trade Body Opinion

Washington, Jan. 22.—Intimations that Attorney General Daugherty might change his recently announced opinion with respect to trade associations, have served to help clarify the uncertain situation which resulted from Mr. Daugherty's recent letter to Secretary of Commerce Hoover. Trade associations have been writing to the department of commerce regarding their rights in the collection of statistics. In reply, Mr. Hoover has told the associations he is awaiting advice from the department of commerce legal counsel regarding United States Supreme Court decisions. It is not believed Secretary Hoover at present will ask the associations to discontinue their co-operation with the department of commerce in the gathering of trade figures.

While the Daugherty opinion supports the right of trade associations to compile statistics as to production, shipments, sales and stocks through a government department, it was pointed out by Mr. Hoover in his letter asking for the attorney general's opinion that the associations would have no incentive to go to the expense of gathering the figures for government purposes only. Apparently the question of getting the associations to co-operate further with the department of commerce and other government departments is a source of real disturbance to Mr. Hoover.

Distribution of these statistics by government departments only is regarded by the trade associations as so highly impractical that it could not be carried out. Should circumstances force a literal interpretation of Mr. Daugherty's expressed opinion to Secretary Hoover, considerable confusion finally would develop in the work of the trade association work, it is pointed out here.

Quotes Fluorspar Net

New York, Jan. 22.—One importer has adopted the custom of quoting foreign fluorspar on a net ton basis to conform to the domestic market. This seller asks $14.50 per net ton, c.i.f. tidewater, equivalent to $19.50 per net ton, duty paid. Other sellers quote $15 to $15.50 ci.i.f. per gross ton, equivalent to $20.60 to $21.10 per gross ton, duty paid.

Sees Less Competition

New York, Jan. 22.—Robert C. Miller, purchasing agent for the Staten Island testified before the federal trade commission at its opening session here yesterday and today in the inquiry into the merger of the Bethlehem Steel Co. and other steel companies. He stated before the merger the Carnegie Steel Co., Bethlehem, Midvale, and Cambria all bid for the company's business which went chiefly to Midvale. Now he depends on the Carnegie, Jones & Laughlin and Bethlehem companies.

Plate Demands Are Larger

Heavy Tonnage for Tank and Car Work Features Market—Improvement Noted in Most Districts—Price Shows More Firmness

PLATE PRICES, PAGE 261

New York, Jan. 22.—More activity is reflected in the plate market here than for some time. The Carnegie Steel Co. has booked 18,000 tons of plates, shapes, bars and axles for the 1250 cars to be made for Australia by the American Car & Foundry Co. It is understood that approximately 7500 tons have been placed with the same maker for 775 refrigerator cars for the Pacific Fruit express. With expectations of buying of 10,000 cars each by the Pennsylvania and New York Central, and 300 cars by the Reading, indications are that considerable additional car steel will come out in the near future. The New York board of water supply is in the market for a 66-inch steel pipe line for Staten island, and this will require about 3000 tons of 7/16-inch plate. The Boston water department will open bids Jan. 31 on a 60-inch pipe line involving about 1600 tons. The New York department of water supply has plans under way for the construction of a number of steel trunk lines involving a large tonnage. The Standard Oil Co. is in the market for oil storage tanks requiring 4500 tons. There also is a Standard Oil inquiry out for tanks at Baton Rouge, La., involving 500 tons. The Sun Co. has placed with the Warren City Tank & Boiler Works two large tanks and six smaller ones to be erected at Providence. They will take about 1000 tons of plates. The Vacuum Oil Co. has placed one 80,000-barrel tank with the Chicago Bridge & Iron Works for Texas City. The Chicago company also has booked two small tanks at Boston for the Pan-American Oil & Transportation Co. There is a large volume of inquiry for miscellaneous tankage. Other plate demands are fair but smaller in volume than earlier in January. Prices continue to range from 2.35c to 2.50c, base Pittsburgh.

Tanks Require 5000 Tons

Chicago, Jan. 22.—Enlargement of the Standard Oil Co.'s storage facilities at Whiting, Ind., with tanks to be fabricated by itself or the Chicago Bridge & Iron Works, will call for 5000 tons of plates. A large tonnage of plates is going to railroad carbuilders. Bridge and structural interests are also active buyers. General activity in steel plates is the heaviest in some time and new business in the first half of January is understood to have been nearly 100 per cent greater than in the same period of December. The plate price continues 2.60c, Chicago.

Moderate Buying Reported

Pittsburgh, Jan. 22.—Moderate buying is noted in the plate market. Large inquiries for oil storage tanks have not come out, although the number will be increased as oil well drilling activity grows with the coming of warmer weather. The only tank inquiries before the trade are similar to the one placed by a Texas oil company with the Chicago Bridge & Iron Works in the past week, one tank of 80,000-barrel capacity. Gas holders appear to hold the center of the stage at present. Two 5,000,000-cubic foot gas holders for the Iroquois Gas Co., Buffalo, and one 6,000,000-cubic foot gas holder for the Milwaukee Gas Light Co., Milwaukee, Wis., requiring 4800 and 2900 tons of plates, respectively, were placed with the Riter-Conley Co. The plate market continues firm at 2.50c, base Pittsburgh. The Pennsylvania Engineering Works, New Castle, Pa., is expected to issue an inquiry for plates, having been successful in obtaining the order for a stove for the Jeannette blast furnace of the Brier-Hill division of the Youngstown Sheet & Tube Co.

Locomotives Require Tonnage

Cleveland, Jan. 22.—Of chief prominence in the plate market is the 5000 to 6000 tons of plates which will be required for the 100 locomotives for the New York Central system now being figured upon. Car repair orders are calling for an increased amount and the general situation in plates continues to improve. The 3000 tons for a water line at Denver upon which fabricators in this district have been figuring has been disposed of, the municipality having decided to use cast iron pipe instead of steel. An inquiry for 300 tons for stills for an eastern refinery interest remains in the market. Small orders are coming in good volume and with some producers these are 50 per cent above the volume in December. Prices are better maintained at 2.50c, Pittsburgh, although deviations from this level have not disappeared.

Bookings Show Good Gain

Philadelphia, Jan. 22.—New plate business in this district is somewhat quiet at present. However, total bookings so far in January are 50 per cent above the same period in December and orders exceed shipments. Large immediate tonnages are lacking but a number are in prospect, including several gas holders, some oil tank and still work. The market continues at 2.35c to 2.40c base Pittsburgh, with some business gaining at 2.50c. It is understood 2300 tons for 57 locomotives for the Sante Fe placed with the Baldwin Locomotive Works will go to the Lukens Steel Co. Included among the gas holders in prospect, is one for Harrisburg, Pa., involving 1400 tons.

Illinois Operates Better

Chicago, Jan. 22.—Operations of the Illinois Steel Co. are increasing and the average for this week probably will approximate 90 per cent, an increase of 7 to 8 per cent over last week. By the end of the week another stack will have been blown in at South Works, giving the company 21 stacks out of 27 in this district. Inland Steel Co. continues at about 75 per cent. Cold weather has interfered slightly with operations the past ten days in practically all steel plants.

Concrete Demand Slacker

Fewer Tonnages Bought During Past Week as Winter Lull Continues—Inquiries for Spring Work Are Heavier

REINFORCING BAR PRICES, PAGE 261

Cleveland, Jan. 22.—Concrete reinforcing bar awards still are confined largely to lots involving 50 tons and under. Competition for local business by several interests here resulted in their cutting quotations to around 2.00c, Pittsburgh, on attractive tonnages. On a recent job involving rerolled bars, 2.00c, delivered, was quoted, delivery to be made by truck. Road work this spring is expected to take a heavy tonnage of reinforcing bars. One such project now figured is the Cleveland-Massillon road, requiring 400 tons of bars. On bars out of stock, 2.75c, Pittsburgh, is firm. Although prices on new billet and rerolled bars are being shaded by a few interests, most dealers and mills prefer to await increased buying in spring for such tonnage as is needed. The going price on new steel still is 2.40c, Pittsburgh, with 2.30c, a common quotation on good-sized lots. Rerolled bars are quoted at 2.10c, mill with little tonnage being placed at that figure.

Warehouse Prices Increased

New York, Jan. 22.—Prices on reinforcing concrete bars for shipment out of warehouse stocks have been increased and the market generally on stock material now is 2.65c, base Pittsburgh, while on stocks at New York the usual price now is 3.10c base. On concrete bars for shipment at mill's convenience the market continues 2.40c, base Pittsburgh. Lettings during the past week have been small, but the tonnage in prospect is increasing.

Market Remains Quiet

Pittsburgh, Jan. 22.—Postponements appear to be the rule in connection with reinforcing concrete bars. Propositions which were expected to be closed several weeks ago, still are hanging fire. Plenty of inquiry is out but many hesitate to place orders in view of reports circulating with reference to coming price declines. The mill price remains firm at 2.40c, base Pittsburgh, and while one fabricator is quoting a warehouse price on the same basis, another is raising his minimum to 2.65c. Most inquiries before the trade involve small lots up to 100 tons each. Considerable road work calling for larger lots is up for consideration; two projects involving 400 tons. The Jack's Run bridge, Pittsburgh, 300 tons, is expected to be closed this week. Municipal work pending at Hamilton, O., involves 150 tons, while a job for the Pittsburgh waterworks requiring 100 tons will be bought shortly. Bars for various warehouses have yet to be purchased as well as the 400-ton lot for the hall of chemistry building, University of West Virginia, Morgantown, W. Va.

Price Shows No Weakness

Cincinnati, Jan. 22.—Activity in the concrete bar market is almost at a standstill. An occasional 50 or 100 lot is noted but larger tonnages are not now current. New projects are few, the most important being the Northside Exchange building of the Cincinnati Suburban Bell Telephone Co., which will require several hundred tons. Despite the dullness, prices have not dropped below 2.40c, Pittsburgh base.

Business Continues to Drag

Chicago, Jan. 22—Although reinforcing concrete bar interests are figuring on some large tonnages the market lacks force. In a number of instances jobs appear on the verge of letting but seemingly cannot make the grade. Hegeman & Harris, New York, is understood to be low bidder on the general contract for Tribune tower, which will call for several hundred tons of bars. The general understanding is that Starrett Bros., Chicago, will proceed with the new Palmer house, taking more than 1000 tons of bars, if the general cost can be reduced. The 150 tons in the Chicago Pottery Co. job, taken by the Calumet Steel Co., went rail steel. The Burlington railroad bars went on a basis of 2.50c, Chicago, being mill lengths. The market continues at 2.75c to 3.00c, Chicago.

CONCRETE CONTRACTS PLACED

Awards this week	2,725 tons
Awards last week	4,979 tons
Awards two weeks ago	5,847 tons

475 tons, warehouse for Gulf Refining Co., Philadelphia, to American Steel Engineering Co.

450 tons, warehouse for Standard Sanitary Mfg. Co., San Francisco, to Edw. L. Soule Co.

400 tons, Burlington railroad, 200 tons, to American System of Reinforcing; reported but not confirmed, similar tonnage to Corrugated Bar Co.

200 tons, nurses' building, university hospital, Ann Arbor, Mich., to Kalman Steel Co.

200 tons, administration building, Alameda county hospital, Oakland, Cal., to Edw. L. Mich., to Kalman Steel Co.

190 tons, Sioux City, Iowa, high school, to Concrete Engineering Co.

150 tons, vault for Brotherhood of Locomotive Engineers bank, Cleveland, to the Massillon Reinforced Bar Co.

150 tons, building for Chicago Pottery Co., Chicago, to Calumet Steel Co.

110 tons, subway work, New York, to Igoe Bros.

100 tons, warehouse for Richmond Sanitary Mfg. Co., San Francisco, to Badt-Falk Co.

100 tons, Pitt Construction Co., for use at Steubenville, O., to Concrete Steel Co.

100 tons, office building for state of West Virginia, Charleston, W. Va., to Bourne-Fuller Co.

100 tons, building for Kownee Mfg. Co., Niles, Mich., to Kalman Steel Co.

CONCRETE CONTRACTS PENDING

1500 tons, sewer, Brooklyn, N. Y.; pending.

1000 tons, superstructure for pier at Norfolk, Va.; pending.

700 tons, Blake, Moffitt & Towne building, Los Angeles; Clinton Construction Co. general contractor, steel not yet placed.

650 tons, bridge at Perth Amboy, N. J.; general contractor, Stillman-Delehanty-Ferris Co., Jersey City.

400 tons, work for Cleveland-Massillon road; McArthur Contracting Co., Kenton, O., general contractor.

400 tons, Pennsylvania state road work; award to be made soon.

300 tons, Jack's Run bridge, Pittsburgh; bids in.

250 tons, St. Joseph hospital addition, Reading, Pa.; L. H. Focht, general contractor.

150 tons, municipal work at Hamilton, O.; bids in.

110 tons, Stern & Mann store, Canton, O.; bids on revised plans in Jan. 25.

100 tons, Chicago, Milwaukee & St. Paul railroad; bids in.

100 tons, work for Pittsburgh waterworks, Pittsburgh; expected to be placed this week. Tonnage not stated, Mahoning County tuberculosis sanitarium, Youngstown, O.; pending.

Pipe Mills

Book Small Orders—Cast Iron Grade In Larger Demand

PIPE PRICES, PAGE 261 AND 312

Pittsburgh, Jan. 22.—Sustained buying in small lots in noted in connection with buttweld steel pipe and an increased number of carload or 100-ton orders for lapweld is the feature of the present tubular goods market. Jobbers in numerous directions are taking advantage of the present to balance their stocks. Large tonnage orders are rare but the aggregate placed each week is sufficiently large to enable makers to increase operations slightly. The average remains at around 75 per cent of capacity. Lately some improvement has come to the oil country goods market with the better market in oil. Present production is 150,000 barrels per day below consumption so that oil well drilling is expected to increase shortly, particularly since crude oil prices have witnessed further advances. Tentative line pipe propositions continue to be talked of but no real buying will take place in this product until early in the spring. The cards of April 19, 1923 still prevail.

Wrought iron pipe market is said to be firm on the basis of the Jan. 23, 1923 cards and makers are well supplied with backlogs of business against which specifications are being received regularly, together with a fairly good day-to-day buying rate. Within the past month an improved volume of business has been done in boiler tubes. Orders for seamless tubes from the automotive industry are becoming more numerous. Competitive prices are the rule with an occasional extra 2½ per cent discount granted. Lower prices have been made in connection with seamless mechanical tubing.

Concessions Still Granted

New York, Jan. 22.—Bids on 11,710 tons of cast iron pipe will be closed Jan. 31 by the department of water supply. The pipe will include sizes, ranging from 4 to 12 inches. The bulk will be 8-inch size, there being 29,450 lengths. Little else in the way of municipal demand has developed in this market. Prices are unchanged, with concessions under the spot market of $1 on the smaller pipe for shipment over the winter months, and $2 to $3 on the larger pipe.

Prices Are Moving Up

Chicago, Jan. 22.—Increased pig iron prices and good demand have combined to advance cast iron pipe prices $2 a ton and the market in Chicago now for 4-inch is $61.20 to $62.20 and for 6-inch is $57.20 to $58.20. These prices are firm and it is claimed that less can be done only in case of particularly desirable tonnages. The larger public utilities appear to have bought practically all of their immediate needs but smaller ones still are coming into the market. The United States Cast Iron Pipe & Foundry Co. is low bidder on 1000 tons for Cincinnati.

Lettings Are Picking Up

Birmingham, Ala., Jan. 21.—Cast iron

pipe lettings are more numerous, winter buying showing more activity. Sanitary, gas and water pipe makers have been enjoying a heavy demand from California territory. A steamship line announces installation of a regular service every alternate Friday leaving Mobile and delivering at Los Angeles, San Francisco, Portland and Seattle. One of the sanitary pipe making firms of Birmingham received an order for 11,000 feet of standard pipe from San Francisco.

CAST IRON PIPE PLACED

1773 tons, Houston, Tex., to American Cast Iron Pipe Co.
864 tons, 6 to 12-inch pipe for Sacramento, Cal., to United States Cast Iron Pipe & Foundry Co.
781 tons, Laurinburg, N. C., to American Cast Iron Pipe Co.
400 tons, Appleton, Wis., to National Cast Iron Pipe Co.
307 tons, Green Bay, Wis., to American Cast Iron Pipe Co.
213 tons, Eau Claire, Wis., to American Cast Iron Pipe Co.

CAST IRON PIPE PENDING

11,700 tons, 4 to 12-inch cast iron pipe for department of water supply, New York; bids close Jan. 31.
11,000 tons, Detroit; bids in Jan. 28.
2650 tons, Milwaukee; bids in.
1400 tons, South Bend, Ind., negotiations being carried on.
340 tons, 6-inch class B, conforming to American water works specifications, for Seattle; bids in.
Tonnage not stated, 30-mile line for Owensboro, Ky., various sizes; specifications being prepared by city engineer, that city.

Better Wire Demand

Stocks at Mills Being Depleted by Heavy Buying in All Lines

WIRE PRICES, PAGE 261

New York, Jan. 21.—Demand for wire has taken a sudden spurt during the past week compared with the early portion of January. Current bookings average 70 per cent of capacity and on some products the rate is higher. Indications point to further increase in demand in some directions. Demand for galvanized wire reflects a healthy condition. Nail buying also is good. The market continues firm at 2.75c base Pittsburgh for plain wire and 3.00c base Pittsburgh for nails. Galvanized wire continues to take a 60-cent differential.

Day-to-Day Business Fair

Pittsburgh, Jan. 22.—Day-to-day business in wire products is improving each week. More single carload orders are coming from jobbers, some for straight carloads and others for mixed carloads. Now that inventories are over the way is open for placing considerable business of this sort and manufacturers are greatly encouraged over the way it is developing. Plain wire continues firm at 2.75c base Pittsburgh, and wire nails at 3.00c base Pittsburgh. Demand for cement coated nails only is fair, manufacturers noting a falling off since considerable use is made of cardboard boxes by packers who formerly used wooden boxes fastened with cement coated nails.

Stocks Being Depleted

Chicago, Jan. 22.—Demand for wire and wire products is rapidly depleting stocks accumulated by manufacturers in the last quarter. Business is good in all lines, including barbed wire. Jobbers are still buying rather freely. Manufacturing lines evidence good demand. Prices on all wire and wire products are firm.

Sheet Makers Confident

Daily Orders Sustaining Mill Operations at 70 Per Cent—Contracts for Quarter Expected as Pressure Becomes More Noticeable

SHEET PRICES, PAGE 261

Youngstown, O., Jan. 22.—During the past two weeks a decided improvement in sentiment in the sheet market has been apparent here, which is reflected in better operating schedules. The increase in the volume of business has created a feeling of more confidence, and mills are resisting efforts of consumers to line up tonnage of any grade below the full market level. While 2.90c on blue annealed and 3.75c on black still are noted in competitive cases outside this district, they are becoming less frequent. A number of recent purchases at these levels represent options which were given by certain mills when conditions were not as promising as at present. One district producer booked 1560 tons of blue annealed this week at 3.00c, Pittsburgh, while another maker now has 3000 tons of the same grade under quotation at the same figure. Attractive sales of galvanized at 5.00c, Pittsburgh, have been closed with consumers in the Carolinas this week. Galvanized sheet makers serving the South report increasing activity. At some mills galvanized makes up the bulk of rolling schedules. From all appearances the sheet industry here is gaining ground from the standpoint of unfilled tonnage and in this connection the increase is of gradual but substantial character. As far as can be learned uniform prices are being quoted by district manufacturers, namely 3.00c on blue annealed, 3.85c on black and 5.00c on galvanized, Pittsburgh. Renewed interest in high-grade sheets is being manifested and this week some of the large automobile producers got under contract for this quarter's requirements, releasing specifications at the same time. The price on this grade is firm at 5.35c, Pittsburgh, for 22 gage stock.

Book Sheets For Second Quarter

Boston, Jan. 22.—Demand for sheets shows marked improvement. Inquiry for second quarter has appeared and two contracts for that delivery have been entered.

Buffalo Prices Firm

Buffalo, Jan. 22.—Prices of 3.85c Pittsburgh for black sheets and 5.00c for galvanized are held firmly by local makers. The Seneca Iron & Steel Co. is close to full operation with 11 mills going. Placement is good.

Consumers Covered

New York, Jan. 22.—Buying of sheets is considerably smaller than in the opening weeks of January. It is said this is due to the fact considerable tonnage was bought in anticipation of actual requirements because of the attractive prices obtainable a few weeks ago. Specifications on first quarter contracts are fair and the indications are that consumption has shown no shrinkage recently. Prices have not been tested during the past week. Most mills are adhering firmly to 5.00c, base Pittsburgh, on galvanized, 3.85c on black and 3.00 on blue annealed, but consumers say they have received lower quotations on galvanized and black sheets. The fact that railroad carbuilders are figuring on inquiries for about 300 passenger cars is of interest in the sheet market.

Specifications Are Good

Chicago, Jan. 22.—Makers of steel sheets are well booked for the first quarter and specifications are coming in satisfactorily. A fair volume of automobile business has been placed in the past week. The local mill that took Japanese business is rapidly working this off. No one industry is a particularly large factor in the sheet business but the mills are comfortably booked. Prices are holding firm at 3.00c, Pittsburgh, for blue annealed; 3.85c for black, and 5.00c for galvanized.

Operating Rate Maintained

Pittsburgh, Jan. 22.—While sheet mill operations are not increased, they are being maintained at an average rate around 70 per cent. The American Sheet & Tin Plate Co., continues approximately at 85 per cent. These schedules are sustained by day to day orders from customers who have not placed contracts for the quarter's requirements but who are buying against contracts to be placed later. This is particularly true of full-finished automobile sheets This method is fairly satisfactory to the sheet manufacturers, being considered superior to the placing of large contracts with subsequent specifications. Practically every sheet consuming line is furnishing its share of the business, but since the present buying rate is by no means commensurate with the rate of consumption, it is anticipated that users soon will be clamoring for deliveries, and bidding for the available supply, unless prompt action is taken to protect their needs. Sheet manufacturers expect some action will be taken this week or next, but until contracts are placed sheet mill operations will not be increased. Automobile, agricultural implement, stove and range, metal lath and other interests are represented in the list of present buyers. Three or four makers are selling at $2 below the market on blue annealed, black and galvanized sheets. One or two who maintained the full market prices during December have slipped back to the 2.90c, 3.75c and 4.90c, Pittsburgh, levels named by manufacturers the latter part of last year on blue annealed, black and galvanized, respectively. Full-finished sheets, however, continue firm at 5.35c.

Eastern Market Appears Firmer

Philadelphia, Jan. 22.—Sheet prices appear firmer, but buying is smaller so the market is not thoroughly tested. Mills report good specifications on contracts. The past week's business also included a number of contracts for additional tonnage in the first quarter. Anything under 5.00c Pittsburgh, is exceptional on galvanized. The price of 3.75c, Pittsburgh, has not disappeared on black, but is quoted less frequently.

Shape Awards Heavier

Larger Projects Closed as Inquiries Gain in Volume—New York Repair Shop Takes 10,000 Tons—December Bookings Highest Since April

STRUCTURAL SHAPE PRICES, PAGE 261

Washington, Jan. 22.—Sales of fabricated structural steel in December, totaling 181,741 tons, recovered sharply from the slump existing in that industry since spring. The month just ended was the largest since April when sales totaled 186,117 tons. Shop activity showed a proportionate increase. December operations registered 81 per cent of capacity compared with 53 per cent for November, and as compared with 80 per cent for April, the second largest month of the year. December sales were reported by 146 companies with a monthly capacity of 224,982 tons. These companies had computed bookings of 205,500 tons in December.

Bookings in 1923 totaled 1,803,856 tons, as compared with 1,690,566 tons in 1922. The monthly average of operations in 1923 was 64.5 per cent of capacity while in 1922 it was 64 per cent. Average monthly bookings in 1923 totaled 150,321 tons as compared with 140,881 tons in 1922.

For comparative purposes the figures below are prorated to obtain the estimated total for the United States of a capacity of 250,000 tons per month. The figures represent the tonnage booked each month by 177 identical companies, six of which are now out of business, with a capacity for 1923 of 234,057 tons per month.

	Actual bookings tons	Per cent of capacity	Estimated total bookings
December	138,737	60	150,000
1922 total	1,690,566		1,921,250
1922 mo. aver.	140,881	64	160,104
January, 1923.	173,294	74	185,000
February	184,887	79	197,500
March	220,400	94	235,000
April	186,117	80	200,000
May	131,875	56	140,000
June	118,117	50	125,000
July	117,563	50	125,000
August	134,431*	58	145,000
September	121,096**	52	130,000
October	111,762***	48	120,000
November	122,573****	53	132,500
December	181,741*****	81	202,500
1923 total....	1,803,856		1,937,500
1923 mo. aver.	150,321	64.5	161,458

For first four months of 1922 figures of Bridge Builders and Structural society revised on basis of 250,000 tons capacity.

*Reported by 176 firms with a capacity of 232,857 tons. **Reported by 174 firms with a capacity of 232,107 tons. ***Reported by 169 firms with a capacity of 231,257 tons. ****Reported by 153 firms with a capacity of 223,472 tons. *****Reported by 146 firms with a capacity of 224,982 tons.

Building Activity Is Widening

Chicago, Jan. 22.—Each week sees prospects for a tremendous building program in the spring growing brighter. Not alone in Chicago but also in outlying territory is a record-breaking number of projects developing. In Chicago the general contract for the Palmer House, requiring 17,000 tons of steel, has been awarded to Starrett Bros., 8 South Dearborn street, and a decision will be made in about two weeks to go ahead provided material prices are deemed reasonable. The Hegeman-Harris Co., New York, has been awarded the general contract for the Tribune Tower, and the American Bridge Co. has the 7000 tons of steel. Bids have been taken on 900 tons for foundations for the Lake Shore Athletic club; the superstructure will require about 4000 tons. The American Bridge Co. has taken 1675 tons for the Northern Pacific bridge work and the Llewellyn Iron Works 1800 tons for a public building in Los Angeles. The Snelling-Mendota bridge at Minneapolis, on which bids will be taken Feb. 14, is estimated at 7500 tons. The plain material price continues 2.60c, Chicago.

Award 10,000-Ton Job

New York, Jan. 22.—Featuring the local structural market is the award of approximately 10,000 tons for the municipal central motor repair shop. Other awards of the past week have involved considerably smaller tonnages, and in the aggregate have not run heavy.

Erected prices for loft buildings range from $102 to $107 while office building erected quotations run from $107 to $112. Apartment erected prices are much higher but due to the great variety of types are difficult to define.

Large Tonnages Are Few

Pittsburgh, Jan. 22.—Large tonnage awards as far as local fabricators are concerned continue few. The aggregate is large. Pittsburgh-Des Moines Steel Co. has booked about 2000 tons so far this month, including a coal station at Nimacolin, Pa., for the Buckeye Coal Co., subsidiary of the Youngstown Sheet & Tube Co., 1000 tons. The remainder involves lots of one ton up to 100 or 200 tons at a time. The Jones & Laughlin Steel Corp. will doubtless fabricate the steel for its own warehouse on the South Side here, involving about 1000 tons. The price of plain material still is 2.50c, base Pittsburgh, and several fabricators are less inclined to name low figures on material fabricated and erected.

Better Tone Is Noted

Cincinnati, Jan. 22.—A decidedly better tone is noticeable in the local structural market. Inquiries and orders continue to come in larger volume, and the present situation bears all the signs of a general revival of buying. Several large builders, usually close to the market, now are bringing out specifications and some sizable tonnage has been placed recently which will not be required for several months. Both of these developments are recorded as significant of the strength of the market. The largest award was 600 tons for a 100,000-cubic foot capacity gas holder for the Ashtabula Gas Co., Ashtabula, O. New inquiries range from 400 to 600 tons. Bids are being taken on the new Knights of Columbus building, Columbus, O., which involves 600 tons, while the new home of the state agricultural department, Columbus, requiring 500 tons, will be out for bids next week. The Stacey Mfg. Co. reports that it is figuring on a gas holder, which will require 600 tons.

Booking Rate Improved

Philadelphia, Jan. 22.—Structural shape demand here is well maintained with an improved rate of bookings reported last week by one eastern mill. Operations are from 60 to 70 per cent. From the tonnage standpoint the market is firmer. Anything under 2.40c, Pittsburgh, is exceptional on plain material.

Heavier Projects Coming Out

Cleveland, Jan. 22.—Heavier structural shape inquiries continue to be brought out as increased confidence is evidenced in a resumption of large consumer buying. Louisville & Nashville railroad has closed bids on 1900 tons of bridge work and will take bids until Jan. 31 on the 6500 tons additional, previously announced. An unnamed project involving 2000 tons is being figured by a northern Ohio fabricator. Among the inquiries of the week are those for the Holland Bread Co., Toledo, O., and the General Match Co., Reading, O., each involving about 200 tons. Cadillac Motor Car Co., Detroit, is about to buy 500 tons for its foundry buildings, for which the Austin Co., Cleveland, is engineer. Plain material prices continue firm at 2.50c, Pittsburgh.

STRUCTURAL CONTRACTS PLACED

Building awards this week..... 52,581 tons
Building awards last week..... 10,576 tons
Building awards two weeks ago.... 43,333 tons

10,000 tons, municipal central motor repair shop, New York, to New York Shipbuilding Co.

7000 tons, Tribune tower, Chicago, to American Bridge Co.

4800 tons, plates for two 5,000,000-cubic-foot gas holders, Iroquois Gas Co., Buffalo, to Riter-Conley Co.

4500 tons, addition to store of J. L. Hudson Co., Detroit, to Whitehead & Kales. Entire project to require 7400 tons.

4500 tons, Bank of America, New York, through Post & McCord, to American Bridge Co.

3500 tons, coal breaker, Lansford, Pa., for Lehigh Coal & Navigation Co., to McClintic-Marshall Co.

2900 tons, plates for one 6,000,000-cubic foot gas holder for Milwaukee Gas Light Co., Milwaukee, to Riter-Conley Co.

2300 tons, Binner-Mitler loft building, Thirty-fifth street, New York, to Hedden Iron Construction Co.

2300 tons, Carl Schurz school, Chicago, to A. Bolters Sons.

2000 tons, transmission towers for Hetch Hetchy project, to Pacific Coast Steel Co.

1800 tons, Museum of History building, Los Angeles, to Llewellyn Iron Works, 600 tons, sublet to American Bridge Co.

1675 tons, Northern Pacific railroad, girder spans, to American Bridge Co.

1500 tons, garage, Worcester, Mass.; through L. A. Scott, New York, to McClintic-Marshall Co.

1200 tons, MacMillan building, Fifth avenue, New York, to Hedden Iron Construction Co.

1200 tons, Meyer apartment, 1040 Park avenue, New York, to Bethlehem Fabricators, Inc.

1000 tons, school No. 80, New York, to Hay Foundry & Iron Works.

1000 tons, coal handling station for Buckeye Coal Co., Nimacolin, Pa., to Pittsburgh-Des Moines Steel Co.

1000 tons, addition to Vanderbilt avenue building, corner Forty-second street and Vanderbilt avenue, New York, to Levering & Garrigues.

1000 tons, miscellaneous work in Pittsburgh and adjacent territories, to Pittsburgh-Des Moines Steel Co.

900 tons, Montgomery building, Spartansburg, S. C., to McClintic-Marshall Co.

700 tons, galleries and floor plates at Crawford avenue station of Commonwealth Edison Co., Chicago, to Vierling Steel Works.

500 tons, crane runway for power plant at Mishawaka, Ind., awarded through New York interests, to McClintic-Marshall Co.

400 tons, building for Hutzler Bros., Baltimore, to Bethlehem Fabricators, Inc.

400 tons, apartment, East Sixtieth street, New York, to Harris Structural Steel Co.

400 tons, Roth loft building, Thirty-sixth street, New York; to independent fabricator.
400 tons, plant for Dayton Power & Light Co., Dayton, O., to American Bridge Co.
303 tons, highway bridge near Cape Girardeau, Mo., to Missouri Bridge & Iron Co.
283 tons, turbine room for Crawford avenue station of Commonwealth Edison Co., Chicago, to American Bridge Co.
200 tons, Vermillon county high school, Newport, Ind., to Central States Bridge Co.
170 tons, kiln building, United States Gypsum Co., Genoa, O., to Pittsburgh Bridge & Iron Co.
165 tons, Union Pacific railroad, bridge repairs, to American Bridge Co.
150 tons, College of Pacific, Stockton, Cal., to Western Iron Works.
135 tons, bridge for Philadelphia & Reading railroad, Conshohocken, Pa., to McClintic-Marshall Co.

STRUCTURAL CONTRACTS PENDING

12,000 tons, 26-story building for Buhl Land Co., Detroit; Davis & McGonigle, general contractor. Steel bids to be taken shortly.
7500 tons, Snelling-Mendota bridge, Minneapolis; bids in Feb. 14.
6500 tons, bridge work for Louisville & Nashville railroad; bids in Jan. 31.
4000 tons, office building for Insurance Co. of North America, Philadelphia; bids asked.
3000 tons, schools Nos. 197, 33 and 116, New York; contractors' bids in.
2400 tons, Pueblo Conservancy district, Pueblo, Colo.; 1200 tons, Mt. Vernon Bridge Co., low bidder; 1200 tons Virginia Bridge & Iron Co., low bidder.
2300 tons, schools Nos. 109 and 201, New York; readvertised bids close Feb. 7.
2000 tons, apartment at Lexington and Forty-ninth street, New York; Mott B. Smith, architect, receiving contractors' bids.
1900 tons, bridgework for Louisville & Nashville railroad; bids in.
1300 tons, Peabody hotel, Memphis, Tenn.; bids being taken.
1300 tons, Security Trust & Savings bank, Long Beach, Cal.; bids in.
1100 tons, Paul Haring loft building, Fifty-eighth street, New York; pending.
900 tons, foundation for Lake Shore Athletic club, Chicago; bids in.
700 tons, loft at 252 West Thirty-eighth street, New York; pending.
600 tons, hall for Knights of Columbus, Columbus, O.; bids in Feb. 4.
600 tons, Art Color Printing Co., Dunnellen, N. J.; bids asked.
500 tons, power house and turbine foundations for Midwest Refining Co., Casper, Wyo.; pending.
500 tons, loft building, 7, Thirty-ninth street, New York; pending.
500 tons, aluminum and gray iron foundry for Cadillac Motor Car Co., Detroit; again active. The Austin Co., Cleveland, engineer.
400 tons, Downey loft building, 8 West Thirty-seventh street, New York; Post & McCord taking erectors' bids.
400 tons, bank at Hagerstown, Md.; Wineberger & Weishoff, 345 Madison avenue, New York, taking contractors' bids.
400 tons, public service commission, Harrison, N. J.; bids asked.
400 tons, bakery, Boston; pending.
400 tons, substructure for Snelling-Mendota bridge, Minneapolis; bids in Feb. 14. Alternative bids to be taken on reinforced concrete for entire bridge, or 2000 tons bars and spirals in addition to substructure.
300 tons, cattle barn, state fair grounds, Columbus, O.; bids in Jan. 31.
300 tons, store for Stern & Mann Co., Canton, O.; bids on revised plans in Jan. 28.
300 tons, Middough building, Long Beach, Cal.; bids being received.
300 tons, bridge floor, Atlantic City, N. J.; pending.
290 tons, two steel scows and a barge for United States engineer, at Milwaukee; Sturgeon Bay Dock Co. low bidder at $47,500.
255 tons, theater at Pensacola, Fla.; bids in.
250 tons, Samuel Levy apartment, 125 East Ninety-third street, New York; pending.
200 tons, factory for Holland Bread Co., Toledo, O.; bids asked.
200 tons, factory for General Match Co., Reading, O.; general contractors' bids in.
200 tons, Mobile & Ohio railroad bridge; bids in.
200 tons, building for Union Car Building Co., Casper, Wyo.; bids in.
175 tons, high school, Palmerton, Pa.; N. Y. Loux, low bidder.
110 tons, colored veterans memorial building, Atlantic City, N. J.; bids on general contract in Jan. 30.
Several hundred tons, extension to pier shed of Pennsylvania railroad, 125th street, New York; general contractors' bids being received.
Tonnage not stated, Bascule bridge, Eleventh avenue, Tacoma, Wash.; pending.

More Car Needs Planned

Chicago Reports Requirements of 41,700.—New York Central To Take 18,000 and Pennsylvania 10,000—Track Accessories Active

RAILROAD TRACK MATERIAL PRICES, PAGE 261

Chicago, Jan. 22.—Local car builders have not yet received formal inquiry but it is rumored that the Louisville & Nashville is in the market for 8000 cars, the Pennsylvania for 10,000, the Sante Fe for 5200 and the New York Central for 8000 in addition to the 10,000 it now is seeking. The Union Pacific has a definite inquiry out for 500 tank cars.

The leading maker of steel rails booked about 12,000 tons in miscellaneous lots last week. Several of the larger western systems have not yet placed all of their 1924 requirements and may be buyers shortly. The railroads are not now pressing so heavily for immediate delivery but are willing to take more rails than are now being shipped. Activity in light rails is improved somewhat, but still is at low ebb.

Track fastenings demand is active. The Great Northern and Northern Pacific railroads have been heavy buyers of spikes and bolts and these railroads plus the Missouri Pacific, Wabash, Pennsylvania, Pere Marquette and the Soo line are expected shortly to be heavy buyers of tie plates. Sales of spikes and bolts in the Chicago district in the past 30 days are estimated at fully 150,000 kegs.

Santa Fe is expected to close on its inquiry for 5200 cars within a few days. The total consists of 2000 refrigerators, 1000 box, 200 dump, 500 gondolas, 500 flat, 500 automobile and 500 stock cars.

Rail Supply Buying Improves

Boston, Jan. 22.—Railroad supply and material demand is active. The Bangor & Aroostook railroad bought 800 car wheels. Street railway inquiry totals 600 car wheels and 1000 axles. Track bolt and nut business is reported better. Prices are all firm.

Southwestern Roads Buy Heavily

St. Louis, Jan. 21.—Southwestern railroads continue to buy heavy tonnages of track accessories. The Wabash is in the market for 1,375,000 tie plates and the Missouri Pacific has not closed as yet on its inquiry for 2,500,000 tie plates. The Baltimore & Ohio has ordered 500 kegs of standard track spikes and the Wabash is in the market for its first half requirements of splice bars and brake beams.

Light Rail Orders Still Small

Pittsburgh, Jan. 22.—Ordering rate in connection with light rails still is small, even carload sales being few and far between. A few carload lots were placed this week at 2.15c, base Pittsburgh, although some manufacturers continue to quote 2.25c, base Pittsburgh. A few orders for rerolled rails were placed, these carrying figures of 1.85c to 1.95c, base Pittsburgh.

Much of the track accessory demand has been met and manufacturers of spikes and tie plates here have good backlogs. Inquiries continue to come out. New York, New Haven & Hartford is expected to close this week on approximately 3,000,000 tie plates and on a large quantity of spikes. The Pennsylvania, which also is in the market for a large quantity of tie plates has not placed its order as yet. Most producers are booked to capacity for four to six months. Prices are unchanged on the quoted bases.

Car Demand Is More Active

New York, Jan. 22.—A more active demand prevails for cars and locomotives, although the total number of cars awarded was not as large as last week. The most important inquiry is 100 locomotives for the New York Central system. Included in recent locomotive awards are 57 for the Atchison, Topeka & Santa Fe, two for the McCloud River, both orders going to the Baldwin Locomotive Works; 10 for Western Pacific, and two for the Detroit Terminal, both contracts going to American Locomotive Co. An interesting item is the authorization by the Pennsylvania for erection in its own shops of 50 locomotives. The Paulista railway of Brazil has awarded two locomotives to the Baldwin Locomotive Works.

CAR ORDERS PLACED

Seaboard Air Line, 932 flat cars, reported in a recent issue as placed, divided equally between Richmond Car Works and Virginia Bridge & Iron Co.
Bangor & Aroostock, 75 steel underframes and superstructures, to Pressed Steel Car Co.
Pennsylvania Salt Mfg. Co., Philadelphia, two tank cars, to General American Tank Car Corp.
Canadian National, 11 coaches, to National Steel Car Corp.
Philadelphia & Reading, 1000 hoppers, allocated to several builders.
Chile Exploration Co., 80 ore cars, to Pressed Steel Car Co.
Australian government, 1250 miscellaneous cars, to American Car & Foundry Co. United States Steel Corp. to furnish steel.
Western Pacific, 775 refrigerator cars, to American Car & Foundry Co.
Great Northern railroad, eight dining cars, to Pullman Co.
Alabama & Vicksburg railroad, one dining car, to American Car & Foundry Co.

CAR ORDERS PENDING

Union Pacific, 500 12,500-gallon tank cars; pending.
Santa Fe, 5200 cars as follows: 2000 refrigerators, 1000 box, 200 air dump, 500 gondolas, 500 flat, 500 automobile and 500 stock cars; award expected this week.
New York Central, 125 to 150 passenger cars bids asked.
New York, Chicago & St. Louis, 100 ballast cars; pending.
American Tar Products Co., 50 tank cars; bids asked.
Canadian Pacific, 150 flat cars; bids aksed.
United Fruit Co., 30 narrow gage cars; pending.

Operate New Coke Ovens

The battery of 61 by-products coke ovens built by the Koppers Co., Pittsburgh, for the Republic Iron & Steel Co., Youngstown, was placed in operation late last week. The addition of these ovens gives the Republic Co. 204 by-product units with a total annual coking capacity of 1,194,000 tons.

The Nonferrous Metals

Copper Stronger—Other Metals Show Little Change with Continued Activity but Buying Off Slightly

	Copper—Electro delivered	Copper—Lake delivered	Spot Straits New York	†Lead New York basis	Zinc St. Louis basis	Spot† aluminum	Spot antimony	Nickel spot
Jan. 16	12.50	12.75	49.00	8.25	6.37½	26.50	10.12½	29.00
Jan. 17	12.50	12.75	49.00	8.12½	6.42½	27.00	10.12½	29.00
Jan. 18	12.50	12.75	49.00	8.25	6.45	27.00	10.12½	29.00
Jan. 21	12.62½	12.75	49.12½	8.37½	6.47½	27.00	10.25	29.00
Jan. 22	12.75	13.00	49.00	8.30	6.47½	27.00	10.50	29.00

†Outside market quotation.

NEW YORK, Jan. 22.—Copper has turned distinctly stronger in the past two days after a decline last week to levels seldom touched by the red metal. Other metals in the meanwhile have shown little change, underlying strength continuing in all of them, despite temporary fluctuations.

Zinc has been more active in the past week, especially for metal going to galvanizers. Prices have increased from 6.35c to 6.45c and 6.50c E. St. Louis for prompt shipment, with futures commanding 2½ points more for each month. Smelters are not pushing business at present levels, as they assert that they are losing money on account of the relatively high ore market, the latter having kept pace lately with the increase in slab prices.

Copper has become more active with the firmer situation in the past few days. Wire mills and brass mills have come into the market, especially to complete first quarter requirements, but producers are asking premiums on business farther ahead. Prompt and first quarter electrolytic is selling at 12.62½c delivered in the East and 12.87½c in the Middle West. Casting went up to 12.50c today. Brass products are in a slow market but there has been some buying of wire and good business in lead-covered cable.

Tin prices have been fluctuating one way and another, mostly up, with London market and sterling exchange as equal factors. Spot has held close to 49c for about a week. Use continues large and old stocks steadily are diminishing.

Aluminum continues strong, with little foreign metal in the open market, but some can be had at 27c New York for 98-99 per cent. Remelted grades and scrap have been going up.

Lead continued to rise until today, when the slackness in buying became more noticeable and prices eased slightly at New York, while at St. Louis the market was stronger than ever at 8.12½c to 8.25c for prompt-February. Use continues heavy and supplies have been restricted but probably soon will be a little larger unless the trouble in Mexico cuts off part of the imports.

Mill Products

Base prices cents per pound, f.o.b. mill

SHEETS	
Copper, hot rolled, 4 oz., min.	20.50
High brass	17.25
Zinc, ga. 9 to 18 (plates ½c less)	9.50
Lead, full sheets (cut ¼c more)	11.50
Aluminum, base 18 ga. and up	36.40
SEAMLESS TUBES	
High brass	21.50
Copper	22.50
RODS	
High brass, round, ⅜ to 2½-inch	15.00
Naval brass rods	17.75
WIRE	
Copper	15.00 to 15.25
High brass	17.75

Old Metals

Dealers' buying prices cents per pound

HEAVY RED BRASS	
Cleveland	9.00 to 9.50
New York	8.50 to 8.75
Chicago	8.75 to 9.00
HEAVY YELLOW BRASS	
New York	5.50 to 6.00
Chicago	6.75
Cleveland	6.75
ZINC	
New York	4.00 to 4.25
Cleveland	3.75 to 4.00
Chicago, dross	4.50
HEAVY COPPER AND WIRE	
Cleveland	10.00 to 10.50
New York	10.00 to 10.25
Chicago	10.50
RED BRASS TURNINGS	
New York	7.50 to 7.75
Cleveland	8.25 to 8.50
Chicago	8.25 to 8.50
YELLOW BRASS TUBING	
Cleveland	5.50 to 6.00
NO. 1 BRASS ROD TURNINGS	
Cleveland	5.50 to 6.00
New York	6.00 to 6.50
Chicago	6.50
ALUMINUM BORINGS	
Cleveland	12.00

Stronger Tone

In Coke By-Product Market Fails to Affect Price Level

New York, Jan. 22.—A stronger tone is noted in the coal tar by-products market with demand improving in some lines but not sufficiently as yet to influence prices. Sulphate of ammonia for domestic account is holding at $2.70 to $2.75 works, and for foreign account at the same range but on the port basis. Light buying by the Japanese continues a feature of the export market, while scattered buying by the fertilizer manufacturers, who are covering last minute requirements for the spring season, comprises the bulk of domestic business.

The market on pure benzol is quoted at 19 to 22 cents works, in tanks, and 27 cents in drums; 90 per cent benzol, 18 to 20 cents in tanks and 26 cents in drums; toluol, 23 to 24 cents in tanks and 29 cents in drums; solvent naptha, 23 to 24 cents in tanks, and 29 cents in drums; commercial xylol, 27 to 29 cents in tanks, and 34 cents in drums.

As has been the case of late, strong demand prevails for motor fuel and producers, who are in a position to furnish a steady supply are going in heavily for this business. This has left them with relatively little industrial benzol for disposal and as a result they are quoting firmly at the maximum of the above quoted range. Trading in commercial xylol is coming out in unusually good volume, with supplies, as a result, scarce.

There also is a stiffening in naphthalene, but not sufficient to affect prices. Phenol is unchanged at 27 cents works in large lots and 30 cents in small lots.

Large Orders

For Refractories Lacking Although Inquiries Are Good—Prices Firm

Pittsburgh, Jan. 22.—Although few large orders are being received in the refractories market, the aggregate of small business is large and operations are being maintained on about a 75 or 80 per cent basis. Several new construction jobs are in the formative stages and actual inquiries for brick are not out as yet but large producers here expect to have these in hand shortly. Each inquiry will involve 1,000,000 brick or more whereas present orders, in the main, call for 50,000 to 250,000 brick at a time.

Prices are if anything a trifle more firm, although there have been no official changes. Specifications on orders lately have been more liberal; consumers' stocks are not heavy as a rule even United States Steel Corp., units having been active recently in specifying freely on old orders. Stocks in the hands of brickmakers are not abnormal after special shapes always carried for regular customers are deducted.

In various directions, a coal strike April 1 is expected and preparations are being made for that contingency. Several attractive orders recently have been received for chrome brick, a few from manufacturers who now are using chrome to the exclusion of magnesite brick, although a few carload orders for the latter kind continue to come in now and then.

Refractories

FIRE CLAY BRICK (Per 1000 f.o.b. works)	
Pennsylvania, No. 1	$42.00 to 45.00
Pennsylvania, No. 2	35.00 to 38.00
Ohio, No. 1	42.00 to 45.00
Ohio, No. 2	35.00 to 38.00
Illinois, No. 1	45.00 to 48.00
Illinois, No. 2	42.00 to 44.00
Kentucky, No. 1	42.00 to 44.00
Kentucky, No. 2	37.00 to 39.00
Missouri, No. 1	38.00 to 40.00
Missouri, high grade	48.00 to 50.00
Maryland, No. 1	44.00 to 51.00
Maryland, No. 2	40.00 to 42.00
SILICA BRICK	
Pennsylvania	40.00 to 42.00
Chicago	49.00
Birmingham	50.00
MAGNESITE BRICK (Per Net Ton Seaboard Base)	
9 x 4½ x 2½	$63.00 to 65.00
CHROME BRICK (Per Net Ton)	
9 x 4½ x 2½	$45.00 to 48.00

A voluntary petition in bankruptcy has been filed by Kruecke Bros, Mfg. Co., 517 Park street, Milwaukee, manufacturer of brass castings and nonferrous metal products. Liabilities are listed as $57,617, of which $30,500 is unsecured with assets of $42,411.

Prospects Good On Coast

Every Line of Iron and Steel Demand Showing Revival After Holiday Slowness—Building Outlook is For Continued Activity

SAN FRANCISCO, Cal., Jan. 19.—Although general conditions on the Pacific coast point to an active year in iron and steel trading, the buying movement has hardly begun. In one or two lines, concrete bars, for instance, numerous bookings already have been made but little activity is noted in sheets, plates, bolts and nuts.

Construction activity is forging ahead and promises to eclipse 1923. Los Angeles made a December record of $20,758,194 in building permits, compared with $8,955,597 for December, 1922. The extent of building operations in Los Angeles in 1923 will be better understood when it is known that for the 12 months just ended the total valuation of issued permits aggregated $200,133,181, compared with $78,926,394 for 1922.

Pig Iron and Coke

Trading in pig iron and coke is in scattered carload lots and dealers expect little real buying this month. One large importer has received a shipment of 1000 tons of foreign iron and 1200 tons of coke to apply on contracts. Only one large inquiry is before the trade, involving 1500 tons of southern iron for a sanitary ware manufacturer in the Bay district. Spot lots are held at $33 to $34 a ton. The Southern Pacific Co. is asking bids on 500 tons of foundry coke.

Bars, Plates and Shapes

Open-hearth operations have been curtailed, four furnaces being in operation this week, two at the South City plant of the Pacific Coast Steel Co. and two at the Pittsburgh plant of the Columbia Steel Corp. The open-hearth division of the Judson Mfg. Co. is closed for annual repairs. Little merchant bar business is being booked. Demand for reinforcing material is increasing and 1500 tons in larger awards have been placed, and numerous small projects, involving 30 to 60 tons, have been closed. The price for the local product remains unchanged at 3.00c f.o.b. San Francisco, while eastern mills continue to quote 2.85c c.i.f. San Francisco.

Plate prices have strengthened and it is difficult to obtain better than 2.90c, c.i.f. coast ports. The first award of any size closed so far this year involved 100 tons for shore line and pontoon pipe for the port of Portland taken by the Willamette Iron & Steel Co. and the West Coast Iron & Steel Co. of Portland. Bids were opened Jan. 12 for 600 tons for tank work for the Mare Island navy yard.

Structural awards for the week total 4000 tons, the largest being 1800 tons for the Museum of History building at Los Angeles, taken by the Llewellyn Iron Works. The largest project this year involves 2433 tons for three railroad bridges for the Pueblo conservancy district on which bids were opened Jan. 15. Prices are firm at 2.90c, c.i.f. coast ports the minimum.

Other Finished Material

Bolt, nut and rivet bookings in December fell off seasonally. While it is early to expect heavy buying, weakness which prevailed a month ago has disappeared and prices are firm at 60 and 10 off on large machine bolts, cut thread and 65, 10 and 5 off on small rivets. Structural and boiler rivets are firm at 2.90c and 3.10c, base Pittsburgh.

The effect of the announcement by Chicago producers of cold-rolled material at 3.00c, base Chicago, on the local market cannot be foretold as consumers have not come into the market. On all rail shipment, Chicago manufacturers are favored by $3 a ton as the Pittsburgh rail rate per 100 pounds to the coast is $1.15 against $1 from Chicago. On rail and water shipments, via Atlantic ports and the Panama canal, Pittsburgh mills are favored by approximately $200 a ton as the rail and water rate, combined, amounts to 90 cents. Whether consumers will favor the $1 all rail rate from Chicago, taking into consideration quicker shipments and deliveries and possibility of less damaged material, against the saving that can be effected in freight by water shipment, remains to be seen. Prices are firm at 3.00c, Chicago, or Pittsburgh, base.

Demand from private sources for cast iron pipe remains quiet, but municipalities are actively seeking tonnages. During the past week no awards were made but over 6000 tons are up for figures or pending. Prices remain unchanged at approximately $62 per ton delivered.

Warehouse Material

Distributors report a movement of warehouse material continues good from practically all classes of consuming trade and for practically all commodities. Prices are unchanged.

Northwest Sees Business

SEATTLE, Jan. 19.—While there are no features in the market in this territory conditions are favorable and the volume of business is satisfactory. To Jan. 10 Seattle's building permits totaled $2,500,000, which is above the usual month's average. Announcement is made that a $500,000 sugar plant is to be established in the vicinity of Seattle while the Pullman Co. is reported to have acquired 20 acres near this city for a repair plant and car works. The Pacific Car & Foundry Co. has received a contract from the Pacific Fruit Express Co. for 970 refrigerator cars to be built at Renton and Portland. The Northwestern Power & Mfg. Co. has applied to the state for permission to undertake a power development in the Elwha district in the Olympic peninsula to total 20,000 horsepower and costing $1,000,000. A concrete dam 15 feet high and 180 feet in length is contemplated.

Tacoma is making financial arrangements for the construction of a Strauss bascule steel bridge to be erected in Eleventh avenue at an estimated cost of $300,000. New construction announced in Seattle during the week includes three apartment buildings to cost $465,000.

Pig Iron and Coke

While there is little activity interest is sustained. Consumers are well covered for first quarter and are anticipating their needs for second quarter. Importers are quoting about $34 for the best grades of Scotch and English iron, spot stock selling at $1 to $2 premium. The coke situation is unchanged with prices stationary.

Bars, Plates and Shapes

Business is fairly good and wholesalers report an increase over last week. The local steel plant is operating all its mills. Considerable advance work is on the books. Some inquiry has been received from China and Japan, but it is almost impossible to close any business because of unfavorable exchange. Prices are unchanged but the finished market is firm.

Finished Material

Jobbers are replenishing stocks and considerable business has been placed in the East. Practically all steel products are coming out by water from eastern centers, the water lines holding firm at conference rates of 40 cents per 100 pounds for heavier stock and 50 cents for finished materials. Prices remain unchanged and appear well established. Representatives of eastern mills are optimistic over the outlook and have done considerable business in the last two weeks.

Old Materials

Both cast iron and steel scrap remain dull with demand at a minimum. Cast scrap is still available only in limited amounts but it is sufficient for present needs. Prices are unchanged since a week ago. The steel mill is the largest purchaser of steel scrap at present.

Five Furnaces

Are Embraced in Plans for New Capacity Now Taking Form

That a revival in blast furnace construction is approaching is indicated by the developments during the past week when plans for five contemplated or authorized stacks were announced. The significance of these developments is emphasized by the fact that comparatively little ironmaking capacity has been added during the past few years. No stacks were completed in 1922 and only one furnace, with an annual capacity of 155,250 tons, was built in 1923.

Large plans are in contemplation by the American Radiator Co. for the improvement of the North Tonawanda, N. Y., furnaces which it acquired some months ago. These eventually may call for the construction of two new blast furnaces and a battery of by-product coke ovens. Some preliminary figures on this work have been taken. Work already definitely programmed includes the remodeling of a present hand-filled stack into a 400-ton furnace equipped with a skip hoist. A bin system will be installed and also an ore bridge. Contracts for the latter will be let this month. The remodeled furnace is to be completed by July. Freyn, Brassert, & Co., Chicago, are the engineers. If the two new furnaces now under consideration subsequently are added, the entire plant will consist of three stacks. This means that one of the present two furnaces will be dismantled.

It is expected that contracts will be let late this week or during the following week by the Youngstown Sheet & Tube Co. for a new 600-ton blast furnace for its Indiana Harbor division. This company now has one stack at Indiana Harbor, it originally having been built in 1918 by the Mark Mfg. Co.

Officials of the Toledo Furnace Co. have authorized the replacement of one of its two stacks at Toledo, O., by a modern 550-ton furnace. It is expected that contracts for this work will be let within the next few weeks.

Plans now are being prepared by the Central Steel Co. Massillon, O., for a 500-ton furnace. It is believed bids covering the construction of this unit will be asked for before the end of the month. Freyn, Brassert & Co., Chicago, have been retained as engineers.

The Reading Iron Co. announces its charcoal iron department now under construction will be ready for operation in February or March. It will include 20 fires, two hammers, a 23-inch bar mill, two heating furnaces and waste heat boilers to generate steam for power.

Pittsburgh Basing Point Case End Sighted

Washington, Jan. 22.—An end finally is in sight to the lengthy proceeding of the federal trade commission against the United States Steel Corp. in its complaint concerning the Pittsburgh plus method of basing steel prices, with the announcement that the final arguments in the case will start June 9 in Washington.

The brief for the commission, must be submitted not later than May 10, the commission announces, and the brief for the respondent must be submitted not later May 25. The date for the sur-rebuttal of the Steel corporation has been set tentatively for Feb. 15, but is waiting final decision of the Steel corporation counsel. This sur-rebuttal probably will be held in Chicago. The sur-rebuttal must be completed by March 10.

Plans Steel Merger

The Maryland Steel Rolling Co., 1410 Fidelity building, Baltimore, Md., has under consideration a merger to include four steel companies, one of which is the Trenton Strip Steel Co., Trenton, N. J. The plans call for organization of a corporation with capital of $1,500,000. The new company is expected to have facilities for producing over 60,000 tons annually of hot and cold-rolled steel and cold rolled stamping steel in various tempers, gages and widths up to approximately 6 inches. Plans also include the erection of a rolling mill in the Baltimore district.

To Appeal Dissolution

Washington, Jan. 22.—An appeal will be taken by the Cement Manufacturers' Protective association against the decree in federal court ordering the dissolution of the association. It was held recently that the Cement association and the Tile Manufacturers' Credit association were collecting trade facts in violation of the antitrust act. This led Secretary Hoover to ask Attorney General Daugherty for an interpretation of the decree in its effect on trade associations, and to the attorney general's reply that the collection of trade statistics by many trade associations is questionable. The cement case will be carried to the United States Supreme Court.

Coke, Coal Output Show Post-Holiday Gains

Washington, Jan. 22.—The production of beehive coke recovered in the week ended Jan. 12, but failed to equal the preholiday rate according to the geological survey. The total output is estimated at 248,000 net tons against 236,000 in the preceding week and 251,000 in the week before Christmas. Improvement occurred in all the eastern districts except West Virginia. In that state and in the western states production was practically the same as before. The weekly comparison follows:

	Week ended Jan. 12, 1924(a)	Jan. 5, 1924(b)	Jan. 13, 1923
Pennsylvania and Ohio	199,000	192,000	260,000
West Virginia	14,000	14,000	20,000
Alabama, Kentucky, Tennessee and Georgia	16,000	13,000	21,000
Virginia	9,000	7,000	11,000
Colorado and New Mexico	6,000	6,000	6,000
Washington and Utah	4,000	4,000	5,000
United States total	248,000	236,000	323,000
Daily average	41,000	39,000	54,000

(a) Subject to revision. (b) Revised from last report.

Bituminous coal production took a sharp spurt following the holidays. The preliminary estimate for output in the week ended Jan. 19, was nearly 12,000,000 tons, an increase of 32 per cent over the recent low rate.

Awards Perkins Medal

Frederick M. Becket, chief metallurgist of the Electro Metallurgical Co., New York, and vice president of the Union Carbide & Carbon Research Laboratories, Inc., both subsidiaries of the Union Carbide & Carbon Corp., was awarded the Perkins medal of the Society of Chemical Industry on Jan. 11 for his achievements in the field of applied chemistry.

Mr. Becket has spent years in working with electric furnace products, principally those ferroalloys and alloying metals which are necessary to basic open-hearth steel, and the alloy steels used in automobiles, high grade tools and machinery. While he has been associated closely with the entire ferroalloy industry, his influence has been especially marked in his developments in the reduction of molybdenum and vanadium with silicon metal, the perfection of low carbon ferrochromium, chromium metal, and many heat resisting alloys of iron and chromium, and recently the perfection of manufacturing processes and the technique of using the new alloy ferrozirconium.

In addition to these many activities, Mr. Becket has been interested in metallurgical problems connected with welding and cutting by the oxyacetylene flame, and is directing investigations along these lines.

No Mexican Steel

Present Revolt Closes Mines and Furnaces Over Most of Provinces

Washington, Jan. 22.—Growing activity of the revolt against the Obregon government in Mexico is bringing about a complete suspension of industry in that country, information reaching here indicates. The recent request of the Obregon government at Mexico City to the Washington authorities to move troops from Sonora through Arizona, New Mexico and Texas leads many to believe the rebels are within a comparatively short distance of Monterey, where the Monterey Iron & Steel Co. foundries, several rolling mills, machine and car repair shops and the chief metal working industries of the Latin-American republic are situated.

The Monterey Iron & Steel Co. plant, almost on the border line of the states of Coahuila and Nuevo Leon, closed down last month due to difficulty in obtaining raw materials, chiefly iron ore and coal, but is planning to resume Feb. 1. It is indicated by persons conversant with the situation that the Monterey company will have difficulty in resuming operations unless there is a decided change in revolutionary activities. Insurgent forces already have been at the town of Alta, about 85 miles from Monterey. Rebel activities have been largely in the state of Vera Cruz, which adjoins the states of Coahuila and Nuevo Leon.

While the iron and steel requirements of Mexico are far from fully supplied by home products, and construction iron and steel machinery and apparatus are among the heaviest imports, iron foundries and metallurgical works are numerous and include several large establishments. The Monterey Iron & Steel Co. has a blast furnace capable of producing 300 tons daily, three 35-ton open-hearth furnaces and a bessemer converter. The open-hearth furnaces are heated by producer gas.

Coal and coke are supplied from the Coahuila fields and are imported through Tampico by way of San Luis and also Mexico City. Oil fuel is used in some of the operations, such as the production of bolts, nuts and rivets. The Monterey plant has a capacity of 250 tons of ingots daily.

Another important group of iron works is in Hidalgo and the Federal district—Encarnacion and San Miguel, with charcoal blast furnaces and rolling mills. Apulco, with a blast furnace and foundry, and Delicias, with a rolling mill, are among the other industrial cities. At Zapalpa, in the state of Jalisco, there is a small blast furnace and rolling mill, and in Guanajuato are works of some importance.

Mexico's chief exports of iron and steel products from the United States have been steel sheets and plates, galvanized sheets, tin and terne plate, steel rails, barbed, plain and insulated wire, nails, locomotives, automobiles and motor trucks. In 1922, Mexico imported 5049 tons of galvanized iron, 1253 tons of steel sheets and 2645 tons of tin and terne plate. The military operations of the country naturally have put a stop to shipments into Mexico, outside of supplies to fill essential needs and for the military operations.

Iron mines have been demoralized by the revolution and departure of hundreds of employes rather than be drafted into military service by federal or rebel forces. Iron deposits in northern Coahuila are worked on a large scale. In lower California, large iron deposits also are known, and in Sonora there are workable beds of hematite. A famous iron mountain called Cerro de Mercado, near Durango City, is 5000 feet long, 300 to 400 feet high and 1100 feet wide.

Scrap Is Stronger

(*Concluded from Page 262*)

demand and the market is firm. Dealers believe they can obtain $22 Buffalo for heavy melting steel.

Is Firm in Valleys

Youngstown, O., Jan. 15.—The scrap market continues firm. Heavy melting is not obtainable at less than $22.50, but $23 is being paid for desirable large lots. The reported sale of about 15,000 tons of heavy melting to the Wheeling Steel Corp. f.o.b. Steubenville at $23 and the purchase of a southern steel interest at the same price is expected to tighten the market, especially at Pittsburgh. It is reported the Central Steel Co. has bought basic iron from a Cleveland interest at $22.50 per ton, paying about the same price for scrap.

Detroit Prices Harder

Detroit, Jan. 22.—Scrap prices continue to show a hardening tendency. An advance of 50 cents a ton is made by dealers in heavy melting steel and like grades. Quotations generally are up $2 a ton on best grades, while others show an increase of $1 to $1.50. Stocks have shown a decline in the past 10 days while producers have not been as active as previously the later months of last year.

More Being Bought

Birmingham, Ala., Jan. 21.—More iron and steel scrap is being purchased and the old material market is taking on more firmness. Quotations did not change during the past week. Less material is offered in some grades. No long contracts are reported on scrap and dealers are still abstaining from booking big business. More confidence is expressed now than for several weeks. Heavy melting steel continues quiet. Turnings and borings have been more active but quotations remain the same.

Firm at Cincinnati

Cincinnati, Jan. 22.—Iron and steel scrap prices continue to advance as demand shows further expansion. Heavy melting steel advanced from $15.50 to $16 to a range of $17.50 to $18 the past week. Practically all steel items are 50c to $2 a ton above last week. Consumers in the valleys are the heavy purchasers and considerable material is moving from local yards into that territory.

Steel Grades Higher

Philadelphia, Jan. 22.—Good miscellaneous buying is being done in iron and steel, scrap particularly steel grades and cast for steel plants. Prices continue upward, due to the strong situation here and at Pittsburgh. Considerable interest is being taken in an auction at the Philadelphia navy yard Wednesday when 25,000 tons of scrap and 11,000 tons of armor plate. It is not likely there will be many bidders for the armor plate. A feature of the scrap market is the effort of dealers to buy basic pig iron to store in their yards but no such business has been closed yet.

Reaction Has Set In

Pittsburgh, Jan. 22.—After last week's activity in practically every grade of scrap a quiet period follows. Prices advanced 50 cents to $1.50 per ton, heavy melting steel going to $22.50 to $23. Two sales at those figures involving 5000 tons each were made to Steubenville, O. and Vandergrift, Pa. users. A sale of 500 tons has been made to a Verona, Pa. user at $23.25. The market remains quotable on the basis of $22.50 to $23. Specialties cannot be quoted at less than $24 to $24.50. A sale of 5000 tons of shovel turnings has just been made at $18. Heavy breakable cast, rerolling rails, etc., are up 50 cents per ton, fairly large sales of the former material being recorded at $20.

Cleveland Holds Firmly

Cleveland, Jan. 22.—Iron and steel scrap continues strong, prices being influenced most by the situation in nearby centers. Consumers are taking contract tonnage and all embargoes are lifted, but new buying is comparatively light. Dealers, however, are purchasing whenever material is available at anything like their ideas of the market. No changes in listed quotations have been made in the past week.

Strength At St. Louis

St. Louis, Jan. 22.—While the industries have not deviated in any notable degree from their recent policy of hand-to-mouth purchasing, the market for iron and steel scrap continues to display great strength. A number of items have been marked up to new peaks for the present movement. Supplies generally are not heavy. Dealers are buying liberally. In some instances they are paying more than consumers. All cast grades are in strong demand, with stove plate and railroad grate bars $1 and $1.50 higher respectively. Steel specialties continue to advance and wrought scrap is in demand and higher.

British Strike Slows Up Trade

Furnaces Banking as Traffic Is Checked by Walkout of Locomotive Engineers—Export Business Handicapped—Germans and Belgians Quoting Lower Prices —Continental Iron Sold for Delivery to San Francisco

Iron Trade Review Staff Cable

European Headquarters,
IRON TRADE REVIEW,
2-3 Caxton House, Westminster, S. W.1

LONDON, Jan. 22.—British iron and steel trade is feeling the influence of the strike of locomotive engineers. The operation of freight trains has been checked. A number of blast furnaces have been damped down, as the distribution of iron has been hampered. A serious situation for blast furnaces may develop if the strike is not ended soon. The strike also is handicapping exports of British material and adding to the difficulties of the British exporters who have been sufferiing from severe continental competition. German and Belgium manufacturers are naming low prices. Billets are quoted £15 15s ($66.37); bars £6 10s ($27.41) and wire rods, £7 15s ($32.69), Antwerp. The Germans also have sold rails as low as £7 10s ($31.62).

Messrs. Dewendel, French Lorraine interests have taken 12,000 tons of rails for Brazil. Acieries d'Angleur and Societe La Providence, Belgian makers, have booked 6000 tons of rails for Chile. Acieries d'Angleur and the Rombas steel works, Lorraine, have shared 12,000 tons of rails for Finland.

The sale of 500 tons of foundry iron from the continent for delivery to San Francisco at £5 15s ($24.27), c.i.f. is noted among the week's transactions.

Changes in the British market in the week bring the following products to the levels as quoted: Billets and sheet bars, £7 10s ($31.58); English and Scotch plates for home consumption £9 10s ($40); galvanized sheets £18 7s 6d ($77.36); rails for home use £9 ($37.89); tin plate £1 4s 3d ($5.10); hoops for home use £12 ($50.52); furnace coke for export £1 16s ($7.58).

Sterling exchange is figured on a basis of $4.21.

Germans Juggle Prices To Deceive World

H. COLE ESTEP
European Manager, Iron Trade Review

THROUGH certain well known channels of trade information a statement was recently circulated in the United States to the effect that German pig iron is now higher than both British and American iron. It was also inferred that German finished steel prices are suffering from a similar disparity. A price of 116 gold marks said to be the same as $28.05 per gross ton was quoted on foundry pig iron.

This quotation is wholly misleading. It is based on the fictitious rate of exchange for marks which is now maintained in Germany. As a matter of fact the internal price of German foundry pig iron at present is around $24.80, as quoted in recent issues of IRON TRADE REVIEW.

On the Berlin bourse a frantic effort is being made to stabilize the new rentenmark. Therefore 4,200,000,000,000 old paper marks are being exchanged for one rentenmark and the latter is held at par, 4.20 for one doller. But the actual rate for paper marks in New York recently has been 4,350,000,000,000 for one dollar. Rentenmarks are not yet quoted in New York or London but dealings in them in Switzerland have been discounted 10 to 15 per cent.

Gold marks do not exist and prices expressed in gold marks have to be translated into some sort of actual money when business is done. Owing to the depreciation of the paper and the rentenmark, the so-called gold mark prices in Germany have been fixed at fictitiously high levels, being based on the theory that the rentenmark is at par. Therefore a quotation of 116 gold marks has an actual gold value in exchange of only about $24 instead of around $27.60, which is the correct equivalent of 116 real gold marks, the figure $28.05 being an error.

An appreciable proportion of German pig iron and steel products are now being sold in Germany on a sterling basis and export trade is being done almost entirely on that basis or in dollars, settlements being made by bills on London or New York. In fact it is only by quoting in a suitable currency such as sterling or dollars that any true gold equivalents to the present German prices can be determined. This is the reason IRON TRADE REVIEW continues to quote its German prices in sterling. Gold marks do not exist, paper marks have practically no value and rentenmarks do not possess a definite foreign exchange value. So when it comes to actual transactions most of the export business is done in sterling and a fair share of the internal business. The dollar equivalents of the existing sterling prices show that German quotations are not above the world market level. In fact a good many export orders have recently been taken by German producers for shipment to Japan, South America, India and other points at 10 to 15 per cent under world market levels. By juggling the exchange the Germans at present are attempting to make the outside world believe that their prices and costs are higher than is really the case. Well informed experts on international iron and steel trade are not deceived by these tactics.

Current Iron and Steel Prices of Europe

Last Reported Prices Converted into Dollars at Rates of Exchange, January 21

British Market

Corrected to Date by Cable
Home Market Prices. Gross Tons at Works or Furnace

	$	£ s d
SEMIFINISHED STEEL		
Billets, soft steel	31.58	7 10 0
Sheet bars	31.58	7 10 0
Wire rods	46.31	11 9 0
FINISHED STEEL		
Steel bars, England, ⅝ to 3-inch	41.05	9 15 0
Steel bars, England, ⅝ to 3-inch, for export	40.00	9 10 0
Plates, ship, bridge and tank, England	40.00	9 10 0
Plates, ship, bridge and tank, England, for export	37.89	9 0 0
Plates, ship, bridge and tank, Scotland	40.00	9 10 0
Plates, ship, bridge and tank, Scotland, for export	37.89	9 0 0
Beams, England	40.00	9 10 0
Beams, England, for export	37.89	9 0 0
Beams, Scotland	40.00	9 10 0
Beams, Scotland, for export	37.89	9 0 0
Sheets, black, 24 gage	57.89	13 15 0
Sheets, black, 24 gage, for export	55.78	13 5 0
Sheets, galvanized, 24 gage	77.36	18 7 6
Rails, 60 pounds and over	37.89	9 0 0
Rails, 60 pounds and over, for export	36.84	8 15 0
Tin plate, base box 108 pounds	5.10	1 4 3
Steel hoops	50.52	12 0 0
Steel hoops, for export	47.36	11 5 0
PIG IRON		
Hematite, East Coast, Mixed Numbers	21.05	5 0 0
Hematite, West Coast, Mixed Numbers	22.63	5 7 6
Basic, Middlesbrough	20.00	4 15 0
No. 3 Foundry, Middlesbrough	20.84	4 19 0
No. 3 Foundry, Derby, Leicester, Nottingham	20.00	4 15 0
No. 3 Foundry, Northamptonshire	19.47	4 12 6
No. 3 Foundry, Staffordshire	20.00	4 15 0
No. 3 Foundry, Scotch	22.10	5 5 0
Ferromanganese, 76 to 80 per cent	71.57	17 0 0
COKE		
Yorkshire furnace	5.68	1 7 0
Yorkshire furnace, for export	7.58	1 16 0
Welsh foundry	6.84	1 12 6
Welsh foundry, for export	8.42	2 0 0

Where no separate export prices are given, same quotations apply.

German Market

Prices Last Reported
PIG IRON

	$	Pounds per metric ton (2205 lbs.)
Hematite	24.42*	5 16 0
Foundry, No. 3	24.42	5 16 0
Stahleisen, Siegen	26.31	6 5 0
Foundry, No. 1	24.42	5 16 0
Luxemburg Foundry, No. 3		Nominal
COKE		
Lower Silesian furnace	8.72	2 1 5
Lower Silesian foundry	8.72	2 1 5
SEMIFINISHED STEEL		
Billets		Nominal
Sheet bars		Nominal
Wire rods	37.89	9 0 0
FINISHED STEEL		
Standard rails	33.68	8 0 0
Merchant bars	30.52	7 5 0
Structural shapes	31.58	7 10 0
Ship plates	33.68	8 0 0
Medium plates, 3 to 5 millimeters	37.89	9 0 0
Sheets, 1 to 3 millimeters	37.89	9 0 0
Tin plate, per box of 575 kilograms	5.65	1 6 10
Plain wire	56.84	13 10 0
Bands and strips	42.10	10 0 0

All prices are f.o.b. furnace or mill.
*German prices now are quoted in pounds, sterling.

French Market

Prices Last Reported
PIG IRON

	$	Francs per metric ton (2205 lbs.)
Hematite, Lorraine	19.97	450
Basic bessemer, Lorraine	17.53	395
Foundry, Longwy, No. 3, sand-cast	17.08	385
Foundry, Longwy, No. 3, chill-cast	17.53	395
Ferromanganese, 76 to 80 per cent	67.78	1,550
COKE		
French furnace	6.43	145
German furnace, f.o.b. frontier*	9.76	220
German furnace, f.o.b. frontier**	10.34	233
French foundry	7.10	160
SEMIFINISHED STEEL		
Blooms	21.08	475
Billets	21.97	495
Sheet bars	22.85	515
FINISHED STEEL		
Standard rails	24.18	545
Merchant bars	25.52	575
Angles	24.63	555
Normal beams and profiles	24.63	555
Plates, ship and tank, 10 millimeters and thicker	28.40	640
Plates, bridge and tank, 5 to 10 millimeters	30.18	680
Sheets, black, 3 millimeters	31.73	715
Sheets, blue annealed, 2 millimeters	34.17	770
Shafting, cold-drawn, 40 to 60 millimeters	51.03	1,150
Bars, 2 per cent nickel steel	77.66	1,750

All prices are f.o.b. furnace or works.
*Up to 50 per cent of normal requirements.
**Over 50 per cent of normal requirements.

Belgian Market

Prices Last Reported
PIG IRON

	$	Francs per metric ton (2205 lbs.)
Basic bessemer, Belgian	16.85	415
Basic open-hearth, Belgian	17.66	435
Gray forge, Belgian	16.24	400
Foundry, No. 3, Belgian	16.24	400
Foundry, No. 3, Luxemburg	16.85	415
Foundry, No. 3, Lorraine	16.65	410
SEMIFINISHED STEEL		
Blooms	21.92	540
Billets	23.14	570
Sheet bars	23.95	590
Wire rods	33.50	825
FINISHED STEEL		
Standard rails	28.42	700
Merchant bars	27.41	675
Normal beams and profiles	25.38	625
Plates, 5 millimeters and thicker	29.64	730
Sheets, black, 3 millimeters	32.48	800
Sheets, galvanized, 1 millimeter	77.14	1,900
Plain wire	48.72	1,200
Galvanized wire	60.90	1,500
Wire nails	50.75	1,250

All prices are f.o.b. furnace or works.

German Steel Selling at Low Prices

European Special Service

BERLIN, Jan. 10.—There is a better demand for beams from the Balkan and Mediterranean countries. Otherwise there is relatively little activity in German export trade centers. Low prices are still being named and ship plates have been sold to South America at £8 to £8 5s per ton f.o.b., equivalent to 1.55c to 1.60c a pound. German structural shapes are offered at £7 f.o.b., equivalent to 1.36c, and Central European bars are being quoted by German export merchants at £7 to £7 10s (1.36c to 1.45c). These prices are about $15 a ton under the American market and from $5 to $10 under British export prices.

Wire mills in Westphalia are now so busy with Japanese orders that they are maintaining prices in spite of the general declining tendency of the market. The downward course of prices has been accelerated by the dissolution of the *Stahlbund*. Bars are now available on the German domestic market at £7 5s ($31.50) per ton. Wide ranges of prices are being quoted. Consumers are buying strictly from hand-to-mouth in anticipation of further cuts. The Wolff interests recently offered large lots of shipbuilding steel to Hamburg and Bremen yards only to find that business could be transacted only at lower prices. Iron foundries have reduced prices of castings by 20 per cent.

Production is gradually increasing in the Ruhr but it will be many months before full outputs are reached, even if markets are available. The De Wendel group in French Lorraine are negotiating with the Ruhr industrialists for the exchange of Ruhr coke against Lorraine ores. About eight weeks' supply of Spanish and African ore is available at Rotterdam and other ports near the Ruhr. The Thyssen company is now producing 12,000 tons of coal a day compared with 15,000 tons under normal conditions. A few more blast furnaces are being blown in, including one by the Bochumer Verein and two by Thyssen.

German owned mills in Polish Upper Silesia have obtained orders for 150,000 tons of rails from Polish roads.

Continuous Employment To Be Rewarded

Extra compensation will be paid in 1924 to employes of the American Cast Iron Pipe Co., Birmingham, Ala., based on the number of days they worked in 1923. The company has posted the following bulletin in its plant:

"Every employe will receive $1 per day for each day worked during 1923, the minimum to be $156. This will be paid in 26 equal installments, payable every two weeks on days other than regular pay days, and in separate envelopes.

"Boys will receive one-half this amount, or 50 cents per day, for each day worked.

"Payment will be due only to those who remain in the service of the company."

While this is considered a profit sharing plan, the award is based on attendance, and employes must remain in the company's employment throughout 1924 to obtain the full amount due them. For some years the company has had in operation a system of rewarding regular attendance, distributing lump sums with turkeys at the end of the year, with beneficial results. Aside from this the company has a good record for retaining employes over long periods. The roster of "Acipco service men" contains a long list of those who have worked for the company five to 18 years or more.

Strikeless San Francisco, New Record Attained

San Francisco, Jan. 19.—In contrast to the experiences of other large cities San Francisco went through the entire year, 1923, without a single strike of any consequence in the building trades. In fact, it may be said without any strike at all; for the only ones which occurred were of a small number of union plasterers and pile-drivers, the latter lasting less than two weeks. The union plasterers were working contentedly under the American plan until their international officers came and ordered them to strike on penalty of losing their charter. After a few weeks of idleness the men disregarded their international officers and returned to work. With these exceptions, the 20,000 union and non-union men in the building trades of San Francisco worked side by side every working day throughout the year without trouble or controversy of any sort. Not a jurisdictional dispute occurred, and not a single job was held up. The wage scale set by the impartial wage board after extended public hearings, and enforced by the industrial association, guaranteed an excellent wage but prohibited entirely any pyramiding either up or down; and American plan conditions prevailed throughout the entire building industry.

Furthermore, there was no strike in any of the other industries of the community during 1923, except that of the garment workers which lasted but a short time and ended by the workers accepting the American plan basis of employment.

Sheet and Tin Plate Mill Wages Unchanged

Youngstown, O., Jan. 22.—The average price of 26, 27 and 28 gage black sheets in November and December was 3.75c per pound, or the same as in the preceding bi-monthly period, examination of sheet sales by representatives of independent mills reveals. As a result there will be no change in wages of sheet and tin workers in January and February. Wages of both sheet and tin workers are now 48 per cent above respective bases.

The taking of the average price of tin plate was discontinued and the provisions of the last Amalgamated association agreement relating to tin mill wages were made permanent. Tin mill wages were based on black sheet average prices as an experiment for a half year. The results satisfied the workers.

Following is a comparison of average sales prices, corresponding to the bi-monthly periods on which changes in wage scales were applied:

January-February	3.75c	+ 1½	per cent
November-December	3.75c	+ 1½	per cent
September-October	3.70c	+ 3	per cent
July-August	3.60c	+ 6	per cent
May-June	3.40c	+ 3	per cent
March-April	3.30c		unchanged
January-February, 1923	3.30	+ 3	per cent
November-December	3.20	+ 4½	per cent
September-October	3.05	+ 4½	per cent
July-August	2.90	+ 3	per cent
May-June	2.80		unchanged
March-April	2.80		unchanged
January-February, 1922	2.80	+ 1½	per cent
November-December	2.75	—10½	per cent
September-October	3.10	—15	per cent
July-August	3.85	— 3	per cent
May-June	3.95	—10½	per cent
March-April	4.30	—25½	per cent
January-February, 1921	5.15	—19½	per cent

Increases Plant Capacity

The Rockwood Stove Works, Rockwood, Tenn., is making arrangement to increase its plant through the addition of a department to make hot blast heaters and nickel castings. Harry Howard is manager of the plant.

Julius J. Goetz, 105 Wells street, Milwaukee, has been appointed receiver of Titan Truck Co., that city, in Milwaukee circuit court.

Short Day Plan Brings Better Spirit

The Bethlehem Steel Corp. "has never had a better spirit among its employes" than it has had since the abolishment of the 12-hour day, says Eugene G. Grace, president, in a statement issued in regard to the progress made with the short-day plan. The statement follows:

"The changes in hours and wage rates occasioned by the elimination of the 12-hour day were started in the middle of August, and the satisfactory progress that has been made in this important development has been due to a great extent to the earnest efforts which our employes have made, through the employes' representation plan, to assist us in the solution of the many anticipated problems arising out of such a vitally important change of a long standing practice.

"The fact that we have not been under constant pressure for full capacity production since the changes were begun has been a very helpful factor in accomplishing the elimination of the 12-hour day, but this condition also makes it difficult to anticipate what the ultimate economic effects of this change will be.

"While this change requires many employes to work more intensively on the shorter day, we have never had a better spirit among our employes, and I feel that the additional leisure afforded them will prove socially and industrially beneficial."

The Bethlehem employe representation plan has been so successful in promoting good relations between the men and the management that it has been extended to the properties recently acquired by the company. The company announces that the employes have just completed the count of the votes in the annual election of their representatives who will serve during 1924 to represent the employes in all dealings with the management. Of the employes eligible to vote under the rules 87 per cent of the total cast their ballots.

Recent figures show that of the cases brought up under the plan of employe representation, 1857 were settled in favor of the employes and 412 against them.

Justice James C. Van Siclen in the supreme court, Queens, New York, has signed an order restraining the members of Eureka lodge No. 434, International Association of Machinists, from meeting to discuss action in connection with H. Hoe & Co., New York from picketing the company's plant, or from interfering in any way with any employes or any property of the company, pending trial of a case the Hoe company has brought to obtain a permanent injunction against the union.

By-Product Coke Scores Record

Output in 1923 Largest Ever Made by This Branch—Total Production Only Slightly Under Previous High Marks—Shortage of Domestic Fuel Added to Demand—Metallurgical Needs Also Heavy

OUTPUT of by-product coke in the United States in 1923 established a new high record and total coke produced in that year has been exceeded only twice in the past, according to the United States geological survey. By-product production was 37,527,000 tons which was 6,693,000 tons above the previous high record in 1920. Production of beehive and by-product coke together was a shade under the total of 1917 and only 1.8 per cent under 1918 when the record for war-time production was established.

Since by-product coke production first passed that of beehive in November, 1918, it has been continuously in the lead. Its percentage of the total production in 1923, however, was less than in the two preceding years when the production of beehive coke was abnormally low. During 1923 by-product coke production was almost exactly double that of beehive. It is significant that in a year of favorable prices and heavy consumption, normally calling forth maximum capacity of beehive ovens, the latter did not attain a higher total.

Heavy demand for metallurgical coke and a shortage of domestic fuel caused the recovery of demand which was felt even by beehive operators. Following the anthracite strike of 1922 and extending into first quarter of 1923, Connellsville foundry coke was quoted at $8.25 to $9 per ton. Another flurry was caused in September, 1923, when coal mining was suspended for a brief period. May was the month of largest production when by-product ovens were turning out fuel at the rate of 40,000,000 tons per year. During the final five months lessened activity of industry caused a decline in demand and production of coke.

Both classes of producers increased output over 1922. The gain by by-product ovens was 31 per cent and by beehive, 110 per cent. Beehive increase was larger in percentage because of the restricted operation in 1922 while a strike was in progress in the Connellsville regions.

The new by-product plant of the Weirton Steel Co., 37 ovens, which began production in July, was the only new capacity started during the year. By-product ovens under construction Jan. 1, 1924 were approximately 709, of which 541 are additions to existing plants and 168 are at seven small new plants.

Plants in existence at the end of 1923 could produce 44,092,000 tons of coke per year at 100 per cent operation and all conditions favorable. With ovens now under construction completed, this total will be increased to 48,350,000 tons per year. Present plants have a coal carbonizing capacity at 100 per cent operation of 63,000,000 tons, which new ovens will increase to 69,000,000 tons.

Accurate statistics of by-products recovered at coke oven operations in 1923 will not be available for some time. Assuming the quantity of by-products recovered in 1923 bore the same relation to the known production of coke as in 1922, it is estimated by-products consisted of 432,000,000 gallons of tar, 1,182,000,000 pounds of ammonia, figured in the sulphate equivalent of all forms, 582,000,000,000 cubic feet of gas, and 135,000,000 gallons of crude light oil.

United States Steel Corp. common stockholders now number 99,779, compared with 97,075 three months ago. Preferred stockholders number 79,311 as compared with 79,105 three months ago.

Production of Beehive and By-Product Coke

Year	Net tons: Beehive	Net tons: By-product	Net tons: Total	Per cent of total: Beehive	Per cent of total: By-product
1913	33,584,830	12,714,700	46,299,530	72.5	27.5
1915	27,508,255	14,072,895	41,581,150	66.2	33.8
1917	33,167,548	22,439,280	55,606,828	59.6	40.4
1918	30,480,792	25,997,580	46,478,372	54.0	46.0
1919	19,042,936	25,137,621	44,180,557	43.1	56.9
1920	20,511,092	30,833,951	51,345,043	40.0	60.0
1921	5,538,042	19,749,580	25,287,622	21.9	78.1
1922	8,573,467	28,550,545	37,124,012	23.1	76.9
1923	17,960,000	37,527,000	55,487,000	32.4	67.6

Production of By-Product Coke by States
Net Tons

State	1922(a)	1923(b)	Increase or decrease 1923: Tons	Increase or decrease 1923: Per cent
Alabama	3,493,000	4,335,000	+ 842,000	+ 24
Colorado	365,000	448,000	+ 83,000	+ 23
Illinois	11,983,000	3,162,000	+1,179,000	+ 60
Indiana	3,995,000	4,970,000	+ 975,000	+ 24
Kentucky	457,000	435,000	— 22,000	— 5
Maryland	590,000	864,000	+ 274,000	+ 46
Massachusetts	407,000	604,000	+ 197,000	+ 48
Michigan	1,142,000	1,650,000	+ 508,000	+ 45
Minnesota	462,000	693,000	+ 230,000	+ 50
New Jersey	791,000	893,000	+ 102,000	+ 13
New York	1,495,000	1,782,000	+ 287,000	+ 19
Ohio	4,912,000	6,247,000	+1,335,000	+ 27
Pennsylvania	7,152,000	9,312,000	+2,161,000	+ 30
Tennessee	27,000	124,000	+ 97,000	+359
Washington	6,000	31,000	+ 25,000	+417
West Virginia	502,000	924,000	+ 422,000	+ 84
Missouri, Rhode Island and Wisconsin	772,000	1,053,000	+ 281,000	+ 36
Total	28,551,000	37,527,000	+8,976,000	+ 31

(a) Final figures. (b) From monthly reports furnished by operators.

Production of Beehive Coke by Groups of States
Net Tons

	1922(a)	1923(b)	Increase 1923: Tons	Increase 1923: Per cent
Pennsylvania and Ohio	6,939,000	14,484,000	7,545,000	109
West Virginia	418,000	1,037,000	619,000	148
Alabama, Kentucky, Tennessee and Georgia	432,000	1,079,000	647,000	150
Virginia	379,000	721,000	342,000	90
Colorado and New Mexico	207,000	371,000	164,000	79
Washington and Utah	198,000	268,000	70,000	35
	8,573,000	17,960,000	9,387,000	109

(a) Final figures. (b) Estimated from railroad shipments.

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Tax Reform Outranks Partisanship

POLITICS is being cast to the winds by business men and others in many states in the steadily growing sentiment in favor of the Mellon plan of tax reduction, it was reported by delegations coming to Washington to submit their arguments at the recent public hearings of the house ways and means committee which is wrestling with the proposed legislation. This is as it should be. Delegates of the American Bankers' league reported a rising tide of Democratic as well as Republican sentiment among business men and bankers in at least 26 states. At an informal meeting of these delegates prior to the hearing before the ways and means committee, the Mellon sentiment broke out spontaneously. One of the delegates from the West said "the psychological effect of tax reduction will carry on down the line, through the government, state, county and municipalities. I don't care whether Mellon is a Democrat or a Republican."

Should a program of opposition by factions and insurgents in congress succeed in blocking the hope of tax reduction, the leaders and participants of such a combination will place themselves in an indefensible position before the taxpayers of the United States. Of secondary public interest has been the struggle of the house of representatives with the new rules affecting legislation in committees. The taxpayers are more concerned with freedom from oppressive tax burdens than with freedom of debate in the house. Of late years it has seemed that congress could do the country a better service by simply confining itself to talking. But the first and most important business which this congress has before it is tax reduction. Everything else is of secondary importance to this urgent reform.

Politicians in congress have been comforting themselves with the thought that in case of a failure to reduce tax burdens, the blame could be placed upon either the Republicans, the Democrats or the so-called progressive Republicans. Should such a misfortune come to pass, it is certain the country at large will sift out the dross and apportion the blame where it properly belongs. Clearly the Democratic and the insurgent plans of tax reduction represent hastily devised expedients with little recognition of the principles which must govern equitable taxation. The treasury plan, commonly called the Mellon plan, has been worked out by the actuaries and other experts of the treasury department with the sole object of formulating a schedule which would serve the best interests of the United States and all its people, whether rich or poor. This is what the country wants.

Motor Industry Faces Changes

THE January automobile shows, now in full swing, hold a particular interest for the iron and steel industry. In the brief space of a score of years the motor car has risen from zero to an important factor in the steel trade. As shown by the yearly distribution analysis of IRON TRADE REVIEW, published in its annual statistical number, the manufacture of automobiles consumed 10 pounds of finished steel for each 100 pounds produced in 1923. The automotive industry stands fourth in the list of leading consumers of steel. It is exceeded only by the railroads, by building, and by oil, gas and water requirements.

It is significant that no leading manufacturer of automotive vehicles is planning to trim sails during 1924. On the contrary, many have announced increased schedules of production The largest maker of low priced cars is pushing plans for the expansion of plants and facilities, involving an expenditure of more than $100,000,000. Two companies alone expect to make as many cars together this year as all of the plants in the country built in 1923. These enormous outputs of motor cars will create large requirements of finished steel. The stimulus of the demand already is being felt.

In 1923 the automotive industry outdistanced all previous records with a production of 4,014,000 passenger cars and trucks. This was an increase of 50 per cent over the previous record of 1922.

The aggregate registration of cars in the United States is 14,500,000, or one to every eight persons. The industry is still in its expansion period, with an annual capacity nearing 5,000,000 cars. The limit of its full possibilities remains to be discovered. Unquestionably, however, the saturation point exists somewhere. A

few years ago it was believed to be 2,000,000 cars for the United States. Now some think that an estimate of 20,000,000 is too low.

Obviously the industry cannot go on increasing its output by leaps of 50 per cent a year indefinitely. The time is coming when it will settle down to a gait necessary to take care of replacement demand and of a healthy normal growth based upon the increase of population. Moreover, there is the unknown factor of a great potential export demand. The arrival of such a period will mark the evolution of the industry from rapidly growing and enthusiastic youthfulness to stable maturity. Meanwhile competition is going to be severe. It will probably be keenly so in 1924. Last year six companies made 85 per cent of the automobiles produced in this country. Rising costs and low prices are tending to narrow profits and consolidations and absorptions aiming at more economic production are developments which are likely to accompany the next phase of the industry's development.

Immigration Needs More Study

WHILE not as important as some other problems now before the country, no legislative question appears more difficult of solution than that of immigration. To some extent the recent national immigration conference clarified opinions on the subject. The outstanding feature of the conference was the prevalence of a general feeling that the gates never again should be thrown wide open. It was felt that immigration should be restricted along scientific lines.

One question concerns the manner in which immigrants should be selected. It was felt that the literacy test has proven a failure in encouraging desirable immigration and excluding the undesirables. It was brought out that no Lenin or Trotzky would be kept out by a literacy test, but that such a test keeps out men whose sole disqualification is that they cannot read or write.

Another point concerns the contract labor provision. American employers having a dearth of skilled workers are unable because of this law to recruit such workers from abroad, even though there is a surplus of such workers in foreign lands. There can be no question that this law should be modified so that skilled men can be admitted in accordance with the needs of American industry and with assurances as to where they will be given employment.

The 3 per cent restriction on immigration is an arbitrary figure. Whether it should be 1, 3, 5 or 20 per cent should be determined only by thorough study of all facts involved. In this connection, the Commonwealth club of San Francisco recently published a thorough study in which it showed that the American birth rate increased when immigration was slow and that it reduced as immigration increased. The study of the birth rate tended to show that America does not need to renew its population by means of immigration.

That the present immigration law is of an arbitrary character and was intended only as a temporary measure is well known. Alarm which at first was felt as to consequences of the restriction of the free inflow of labor has been dissipated to a considerable extent. There have been extensive developments and applications of labor-saving devices which multiply the effectiveness of the efforts of the individual worker. The country is better off without cheap labor in a volume which tends to discount consideration of individuals.

By-Product Coke Gains Ground

RELATIVE importance of by-product coke is being emphasized with each passing year since it first eclipsed beehive coke in total production in November, 1918. As the open-hearth rail largely has supplanted the bessemer rail after the latter had pushed aside the iron rail, so beehive coke is increasing its percentage of the total tonnage being made and consumed in this country. This is in line with the general trend toward efficiency in all lines of production. Beehive ovens waste all the volatile elements of coal, which return a large profit to by-product operators. Hence all new coke operations are of the latter type. During 1923 conditions were especially favorable for the beehive operator, since a heavy demand and favorable prices united to stimulate production on a profitable basis. Yet the gain in production by beehive operations was not as great as would be expected. Apparently that branch of the industry is not possessed of sufficient recuperative power to answer the stimulus of demand, even at a profit.

It seems likely the future will see continued growth of by-product oven installations and practically no increase in beehive plants. With the continuous growth of total coke production the percentage supplied by beehive operations will grow smaller even if the actual tonnage should remain near its present figure. As a matter of conservation of natural resources this is as it should be, since much actual wealth is wasted in the more primitive method of the beehive oven.

That by-product ovens shortly will be able to supply the entire needs of the country is forecasted by the fact that in an active year like 1923, demanding 55,487,000 net tons, by-product ovens were capable of making 40,000,000 tons, while plants now building will bring possible production to 48,350,000 tons per year. In the light of these figures it is seen that by-product coke may soon practically displace the variety turned out by the older process. Location of new by-product plants is not dependent on coal supply, as is the case with beehive ovens and because of this, better distribution is asssured which is an aid to sales.

Production of Malleable Castings Falls Off

Washington, Jan. 22.—Production of malleable castings in November totaling 52,727 tons, was the lowest monthly output since the department of commerce started compiling these statistics in May. With 125 companies reporting, operations were at but 49.1 per cent of capacity while in October with 116 filing returns 59.9 per cent of capacity was reached. Comparisons of production, bookings, and monthly capacity since May 1923 are as follows:

	Total tons produced	Per cent of capacity	Total tons booked	Monthly capacity
May	64,726	71	52,898	91,174
June	65,168	67.7	42,067	96,240
July	57,881	58.9	41,723	98,241
August	68,069	66.0	39,830	103,068
September	60,930	59.9	38,636	101,750
October	62,238	59.9	48,621	103,837
November	52,727	49.1	37,231	107,350

Receivership Is Asked

The chancery court of Wilmington, Del., has granted a decree returnable Feb. 1, requiring officials of the Standard Tank Car Co., Masury, O., to show cause why a receiver should not be appointed. The plaintiffs, three individuals claim that the company lost $750,000 during the last few months. Officials of the company say that the action was brought by three clerks in the company's St. Louis office, who desire to prevent the moving of the company's tank line from St. Louis to Sharon, Pa.

Holds Annual Meeting

Ten years of operation were celebrated by the Paterson-Leitch Co., Cleveland, iron and steel jobber and fabricator, in its annual meeting Jan. 18. Originally established to handle concrete reinforcing steel, wire and woven wire mesh, the company has expanded into a general steel jobbing business. The warehouse business is in charge of R. L. Stofer, sales manager, formerly with the old Bassett-Presley Co. and later with Republic Iron & Steel Co.

C. J. Paterson was re-elected president of the Paterson company, W. J. Schenk was chosen vice president, L. C. Spieth, secretary and R. I. Leitch, treasurer.

Report Shows Net Worth

The net worth of the Hydraulic Steel Co., Cleveland, which went into the hands of a receiver Oct. 26, 1923, was $3,967,094, when the receivership was declared, according to a statement to preferred stockholders sent out by the preferred stockholders' protective committee following an audit made by Ernst & Ernst at the request of Thomas P. Goodbody, receiver. Unpledged assets were $8,315,954 with unsecured liabilities and reserves of $4,481,415. The balance sheet shows a deficit of $3,504,397. The first month under the receivership showed sales of $548,189 and net profits of $35,721. Committees have been at work for some time trying to evolve a plan for refinancing the company.

Iron Pipe Plan Approved

R. E. McConnell, president of the Centrifugal Cast Iron Pipe Co. announces that stockholders holding 90 per cent of the capital have approved the plan to turn over all assets, except $25,000 in cash or its equivalent, to the Centrifugal Pipe Corp. The latter has authorized capital of 300,000 shares of no par value, of which 283,960 shares will be issued. Holders of the 141,980 common shares of the Centrifugal Cast Iron Pipe Co. have the opportunity to exchange their holdings at the rate of one share for two shares of the new company. The 4010 shares of preferred stock of the Centrifugal Cast Iron Pipe Co. have been retired at $20 a share, the par value.

Alfred E. Mansley has been appointed receiver of the American Steel Equipment Co., Inc., Philadelphia.

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Metal Trades in "Healthy State" Survey Shows

A survey made by the National Metal Trades association reveals that business and industrial conditions are in a healthy state, according to an analysis written by William W. Coleman, president. The association issued a questionnaire, addressed particularly to the leading general manufacturing institutions represented in its membership. These present a diversified range of manufacturing activities, related in many ways to basic industries and business affairs.

Members were asked as to business conditions at present; their prospects for 1924, and for an opinion as to their labor situation. The summary, as prepared by President Coleman, referring to present conditions, states:

"Twenty-seven of our members replied that their orders were good to very good; 20, fair, and only 4, poor. These four are operating in lines which are affected by either the condition of the wheat farmer or a heritage of war surplus stocks which are still in the market."

As to "What of 1924?" the replies are summarized as follows:

"The replies to the questionnaires prophesy that business as a whole will improve during the coming year. Twenty-nine members predict good business in comparison with the 27 at present reporting themselves in that class, and 14 'fair.' Four believe conditions in their lines will be poor.

"Thirteen believe there is an upward tendency in progress; eight believe there will be a decrease, ranging from slight to marked, in business activity. The cause of uncertainty most frequently mentioned in all groups of the replies is that 1924 is a presidential year and that business will be in a somewhat unsettled state until after the November election."

Labor conditions are reviewed as follows:

"Labor conditions apparently are quiet in all sections of the country with no decided movement of wages from the existing levels. Of the five that commented on this phase of the situation, three indicated the wage tendency was up or had been up in recent months, while two indicated a slight drop in the scales of pay. No serious shortage exists in any class of labor at present, although this may change as building operations are resumed next spring. Only nine report a shortage of skilled labor and four of semiskilled. Four members reported a marked shortage of common labor, and two, a slight deficiency. Three predicted a small amount of unemployment during the early part of 1924."

The Wilton Tool Co., Detroit has been adjudged bankrupt. Bankruptcy proceedings were brought some time ago against the firm by the Atlas Steel Corp. and other creditors.

The Business Trend

January 24, 1924

BY JOHN W. HILL, FINANCIAL EDITOR

RECENT events abroad have gripped the attention of the business world. Spectacular exchange weakness has continued. France, alarmed by the downward plunge of the franc, has announced heroic measures to ward off menacing bankruptcy.

Sessions of the reparations committee of experts are getting slowly under way. Despite efforts to expedite matters by energetic American members, the work is likely to progress slowly. Devising a means to save Germany from the most colossal bankruptcy in history is not the task of a day.

In England, the country is prepared to bow to its new masters—the labor party. The sobering influence of responsibility is expected to quiet extreme counsels in the new government. Labor's rise to power is greeted by a railroad strike.

Affairs abroad have not disturbed the immediate domestic outlook. Dominating developments here are the extraordinary easing of money, the expansion of the steel trade and steady improvement in a number of other important lines.

Stock Market Higher

The stock market has shown some uncertainty, but underlying strength prevails. Average values are at the highest levels since last June. Steel shares have been active. The action of the Republic Iron & Steel Co. in paying up dividend arrears on preferred stock has called Wall Street's attention to betterment in the steel trade.

Credit abundance is pronounced. The cash ratio of the federal reserve system has gained 7 points since the first of the year. In the same period in 1922 it gained 4 points. The reduction of rediscounts has been double that of January, 1922. Federal reserve note circulation is the lowest since 1918.

Exports on Cash Basis

Heavy gold imports from Europe are causing credit to pile up here. With European credit at low ebb, foreign trade is now largely on a cash basis. In December exports were the largest since February, 1921, largely due to heavy cotton shipments. Imports declined.

For the entire year of 1923, however, it is seen that exports increased only 8 per cent over 1922, while imports increased 21 per cent. The excess of exports over imports fell to the lowest point since 1914. Exports gained to all countries in 1923 save to Europe.

Freight traffic has shown rather sharp decline in recent weeks. This is largely due to the drop in coal shipments. Coal markets are dull and output is rising. Stocks are large, however. This fact may have some weight in averting a strike April 1. Operators and mine unions meet Feb. 11.

The Barometer of Business

Weekly Composite

	Last week	Week before	One mo. ago	One year ago	1913
Business failures..	525	564	440	540	.....
Cash ratio Fed. Res. System, %.	80.1	78.4	75.7	76.1	.....
Loan rate, 4-6 mo. N. Y. %.....	4¼	4¼-5	5	4¾	5
Aver. 25 indust'l shares	$110.33	$111.20	$108.30	$110.35	$58.19
Aver. 25 railroad shares	$59.95	$59.97	$57.24	$61.71	$82.90
Aver. 40 bonds....	$78.21	$78.22	$76.62	$76.79	$93.00
Car loadings, week ended Jan. 5.....	705,296	615,461	913,000	770,303	*830,282
Bank debits, 246 cities (000 omitted)	$10,444,389	$10,525,824	$9,711,000	$10,607,313	.....

*1920.

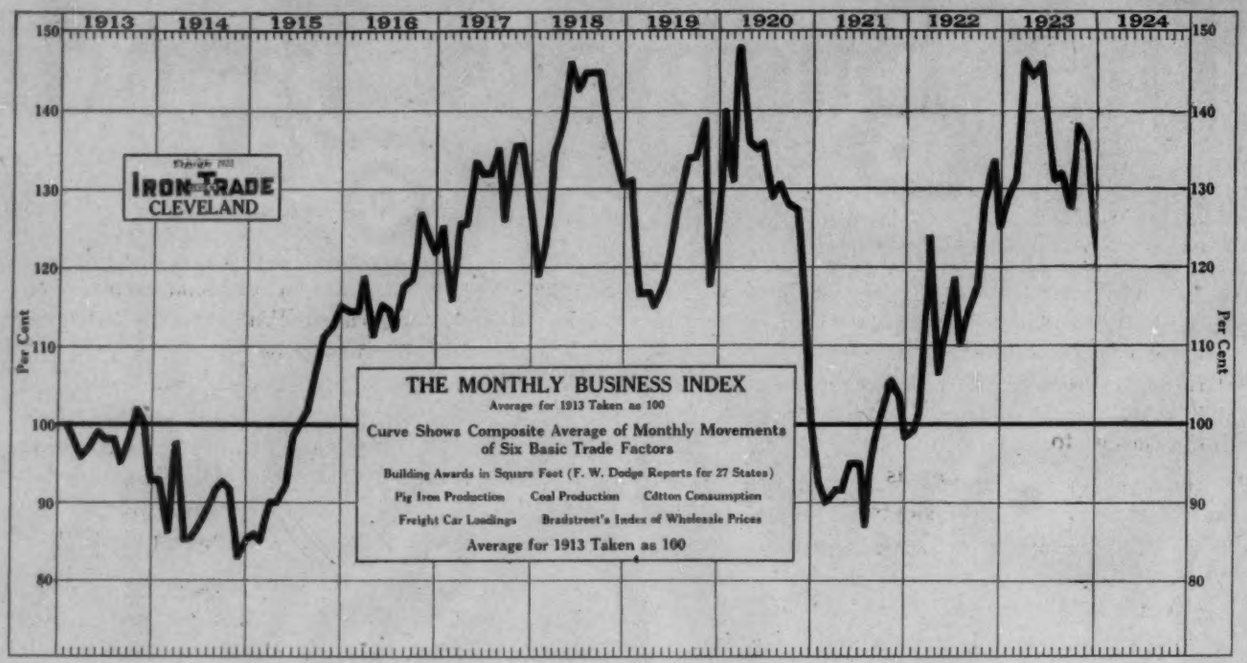
Foreign Exchange (Demand)

	Normal	Last week close	One week before	One month ako	One year ago
Sterling	$4.86	$4.23	$4.26	$4.34	$4.66
Francs	19.3c	4.50c	4.64c	5.05c	6 51c
Lira	19.3c	4.35c	4.38c	4.31c	4.74c

Monthly Comparison

	December	Month before	Year ago	Monthly average 1913
Dodge Building awards in 27 states (sq. ft.).	48,096,300	52,599,500	38,931,300	31,250,000
Business failures: Number	1843	1704	1814	1336
Liabilities	$42,705,000	$50,291,000	$58,000,000	$22,732,000
Exports	$425,000,000	$400,000,000	$344,327,000	$233,195,000
Excess of gold imports	$31,929,697	$39,011,000	$23,730,000	†$630,716
Bureau of labor price index....	151	152	156	100
Bradstreet's price index	144.7	145.4	148.2	100
Economist's British price index..	168.5	167.1	156	100
Cost of living index	165	165.3	156	100
New incorporations	$955,632,000	$909,693,000	$913,901,000	$172,131,000
Railroad net earnings	*$86,130,000	$102,746,000	$78,860,000	$59,301,000

†Excess of gold exports. *November.

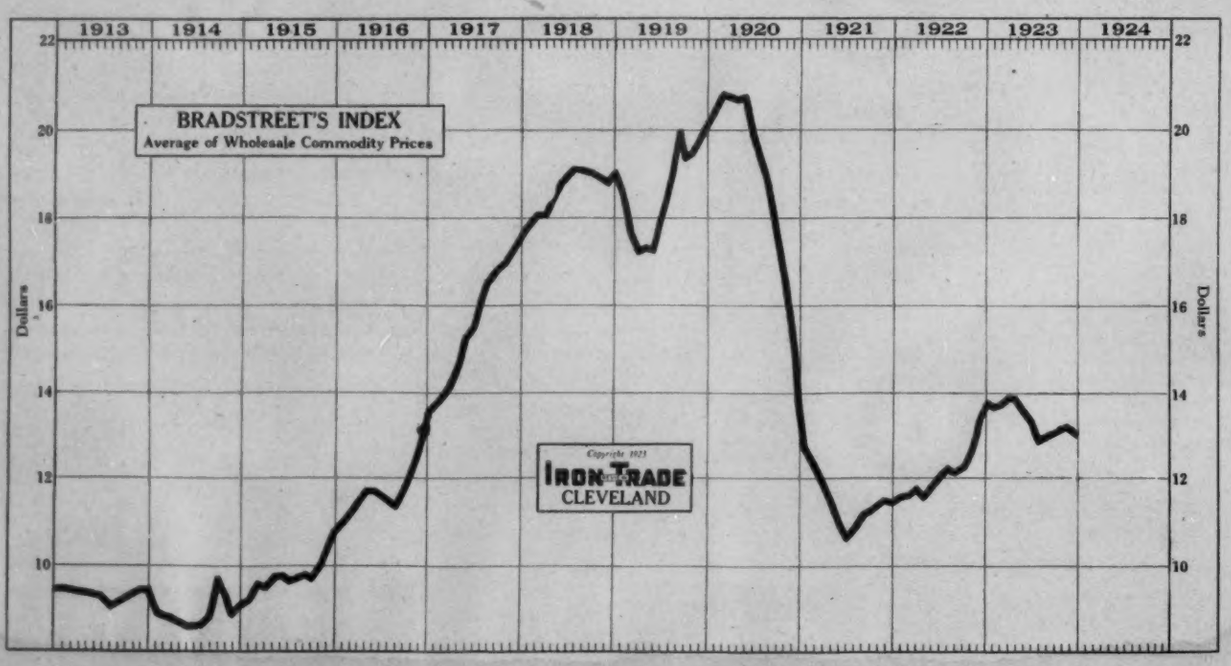


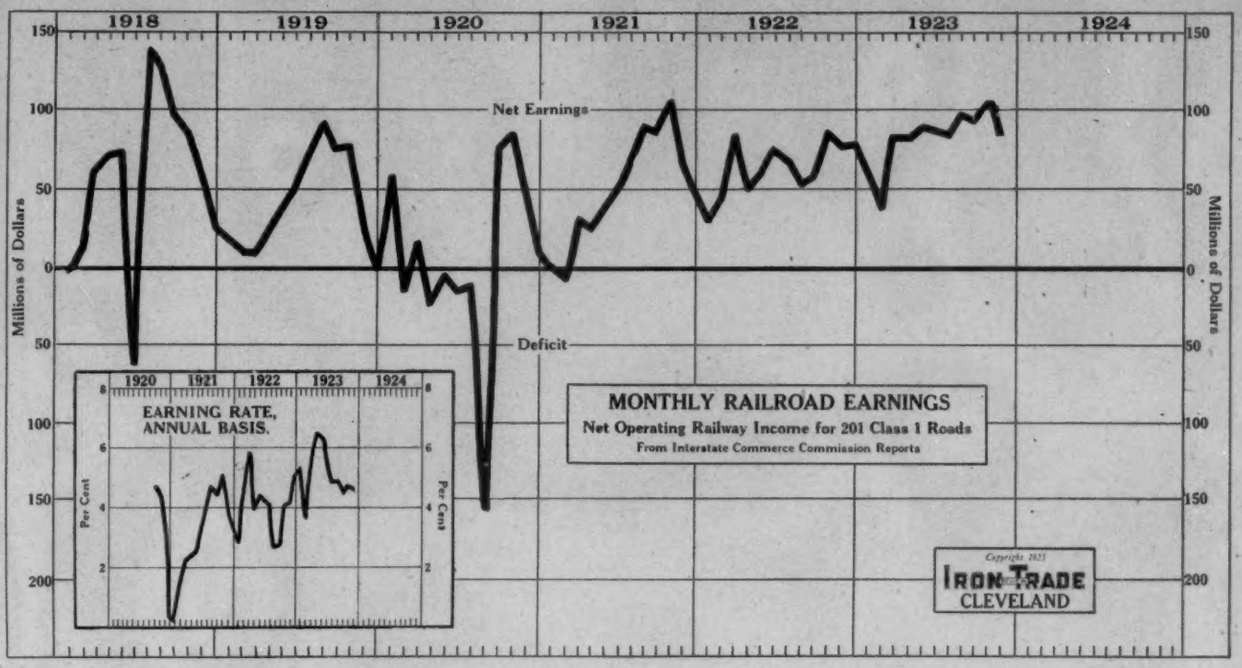
Business Index

THE normal relaxation in industrial activities which customarily appears in December is reflected in the Business Index curve compiled by IRON TRADE REVIEW. The index number dropped from 34.6 per cent above the 1913 average in November to 23 per cent above 1913 in December. This compared with 25.7 per cent above 1913 one year ago. Last month, declines occurred in each of the factors comprising the index. Compared with December, 1922 the factor of building construction alone showed a gain. All others were lower.

Bradstreet's Index

COMMODITY prices maintained their gentle seesawing movement throughout 1923. December brought a slight decline after three months of gradual increase. Last year began with prices rising. They culminated a 31 per cent advance from 1921 lows in the spring of 1923. From that point the pendulum swung back 8 per cent until August. In September an upturn came which lasted through November and cancelled nearly half of the loss from the year's high point. The index is now 44 per cent above 1913. Continued price steadiness is indicated.



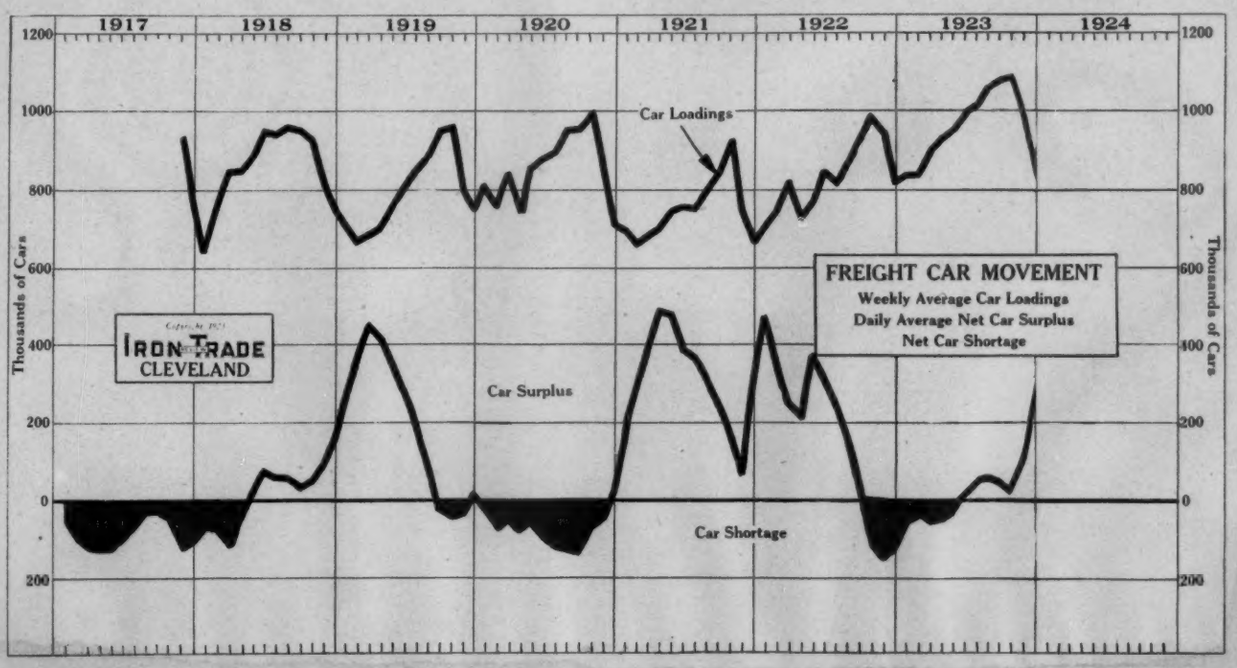


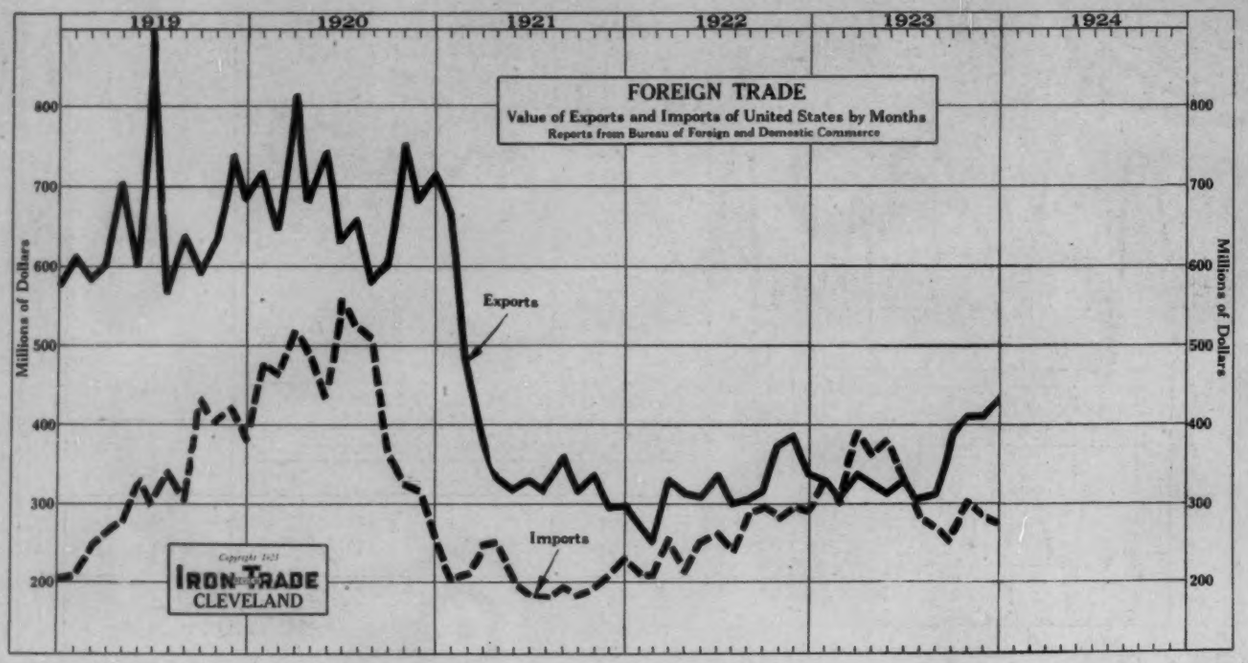
Railroad Earnings

NET earnings of the Class I railroads, comprising all of the important mileage in the country, were $84,516,800 in November. This was at the annual rate of 4.68 per cent on the tentative valuation of the roads. In October these roads earned $102,933,691 or a return of 4.79 per cent. In November, 1922 they returned $81,691,000 at the annual rate of 4.62 per cent. Prospective income for the year is $1,000,000,000, with a rate of return higher than any year since 1916. This increase in earnings reflects the year's unprecedented traffic.

Freight Car Movement

FREIGHT traffic has undergone a decided shrinkage compared with the peak of last fall. In December the final week brought a reduction of car loadings of more than 200,000 cars. Last year's traffic record was unprecedented, falling only a little short of 50,000,000 cars loaded. This was 14 per cent greater than 1922 and 10 per cent over 1920. Diminishing traffic has resulted in a rapidly accumulating surplus of idle cars. Exceptional railroad efficiency has also contributed to the rise of surplus cars. Recent traffic declines have partly reflected lower coal movements.



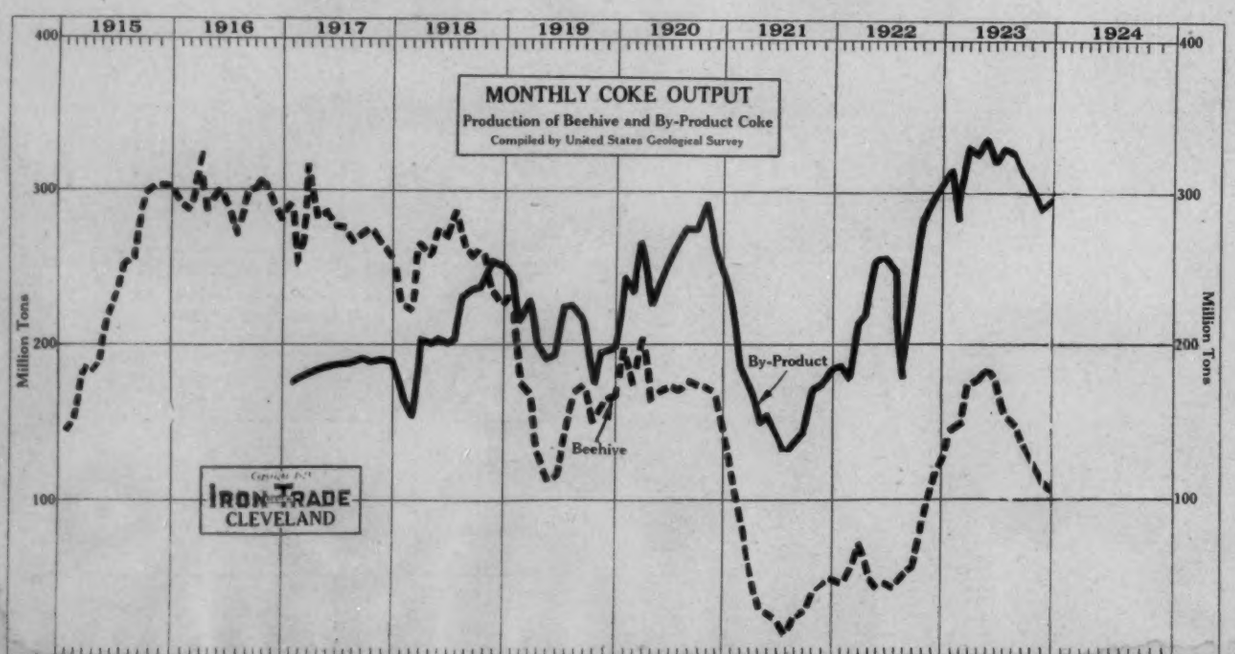


Foreign Trade

DECEMBER American exports totaled $425,000,000, while imports were $285,000,000. This was the largest money volume of exports since February, 1921. The total was swollen largely by heavy shipments of high priced cotton. imports showed a decline both from November and from December, 1922. The year's exports were valued at $4,164,831,000 a gain of 8 per cent over 1922. Imports of $3,788,882,000 increased 21 per cent. The excess of exports over imports of $375,948,000 was the smallest favorable balance of trade since 1914.

Monthly Coke Output

YEARS of industrial activity are relatively more stimulating to beehive coke output than to by-product coke. In 1923 beehive coke ovens produced 32.4 per cent of the total. This was the highest percentage for beehive since the year of activity in 1920. In 1921 the beehive accounted for 22 per cent and in 1922 for 23 per cent of all the coke made. By-product coke output in 1923 was 67.6 per cent against 77 per cent in 1922. In 1923 only one-fourth of the coke output was by-product. Total production of 55,400,000 tons was the highest since 1918.



Build Blast Furnace Plant in Holland

General View of New Blast Furnace Plant, Designed by American Engineers, Now Nearing Completion Near Amsterdam, Holland

AS THE first unit in a complete iron and steel works, the blast furnace plant of the Royal Netherlands Blast Furnace & Steel Mfg. Co., near Amsterdam, Holland, is nearing completion. The two stacks which will be blown-in early in 1924 have an annual capacity of 182,500 tons of pig iron. To supply the necessary fuel a by-product coke-oven battery with an annual capacity of about 250,000 tons of furnace coke has been provided. The plant has been designed and built on American lines under the supervision of Freyn, Brassert & Co., Chicago and London, who are the construction engineers.

The purpose of the plant is partly commercial and partly to make the Netherlands to a degree independent of foreign supplies of iron and steel. Up to date Holland, although enjoying a large transit trade in iron ore, has been compelled to import all of her iron and steel from either Germany, Belgium, or England. The history of the past 10 years has shown that this has disadvantages from a strategic standpoint. In addition, Holland is now a large consumer of pig iron and finished steel products, especially for shipbuilding, and it is believed there is a commerical basis for a purely Dutch iron and steel manufacturing enterprise. The considerable export trade with the Dutch East Indies also is a factor. The Dutch name of the new company is Koninklijke Nederlandsche Hoogovens en Staalfabrieken, and the general offices are at 25 Nassauplein, The Hague.

After preliminary studies made by a committee, the company was formed on Sept. 20, 1918. The necessary capital was supplied by various business interests, including the shipbuilding industry, and banking houses. The total so raised was 17,500,000 Dutch guilders or $7,000,000. In addition to this the Dutch government and the City of Amsterdam participated. At present, the total capital, which has been fully paid up, amounts to 30,000,000 guilders or $12,000,000, of which the Dutch government and the City of Amsterdam, have taken 7,500,000 and 5,000,000 guilders respectively as common stockholders.

Iron To Be Sold at Present

The program embraces the development of a complete iron and steel industry for the Netherlands. For this purpose an open-hearth plant and rolling mills, will be provided. For the time being two blast-furnace stacks have been erected and also a battery of coke ovens for the production of the necessary fuel. Until the steel plant is built the output of the blast furnaces will be sold.

A spacious harbor, which is directly connected to the sea by a canal of sufficient size for steamships, and which also connects with the North Sea canal outside the Ijmuiden locks, gives ready access for steamers bringing the necessary raw materials to the works. The distance from the end of Ijmuiden piers to the company's wharf is only two sea miles. There is 30 feet of water in the canal and the harbor below low water level, so that most all sizes of ships can pass in and out without difficulty. Both the ore and part of the coal will come by sea, the former mainly from Spain, North Africa, and Sweden, and the latter from England, Germany, or Belgium. Holland also possesses coal resources.

The harbor equipment includes two unloading bridges of considerable capacity, which unload steamers by means of grab buckets and convey the raw materials to the storage yard situated immediately behind the bridges. The yard bridge also is equipped to handle the coal and ore in the yard and to convey it to the ore bins and coal-mixing plant. These units are situated immediately behind the ore and coal storage yard. There is plenty of room in the yard for storing of coal, coke, limestone, etc. The whole arrangement is similar to that prevailing at many American plants along the Great Lakes, especially the one at Duluth which also receives both ore and coal by water.

Rhine canal-barges of large size holding 1500 tons of coal can be passed through the Ijmuiden locks and moored at the company's wharf. In this way coal and limestone from continental mines are brought to the plant. Finished products can be shipped in the same way.

For dealing with small ships, also used for handling materials to and from the works, a small inner harbor has been constructed. It is situated inside the Ijmuiden locks, so that these small vessels do not have to pass through them. The plant is also connected up to the Dutch state railway system.

Each of the two blast furnaces has a daily capacity of 250 tons of pig iron using European ore mixtures. The stacks are of the modern American type with skip hoist. The blast for each furnace is preheated in three stoves, which are erected in line with the furnaces. Three turbo-blowers have been

installed in the power house to supply the necessary air.

The furnace gas is cleaned by means of a dust catcher, whirler, and washer, and is used partly for heating the stoves, and partly for firing boilers which supply the necessary steam for the turbo-blowers and for two 5000 kilowatt turbo-generators. These units produce 3-phase, 50-cycle, 6000-volt current which supplies the necessary power for the plant, the surplus being delivered to the regional power supply. The boilers have been equipped with oil burners as a standby and to ensure a more constant supply of power.

At present the hot metal flows through an iron runner into pig beds in the usual way, from which it is broken and loaded into cars. As described above this iron can be shipped by rail, by barge, or by steamer.

In order to insure a suitable quality of fuel for the blast furnaces it was decided to put up a coke-oven plant. Also from a commercial point of view the coke ovens are an advantage, as the European market for coal is much more varied than the market for coke. The capacity of the coke-oven plant conforms to that of the blast furnaces.

In connection with the coke-oven plant there has been erected a coal-crushing and mixing plant, in which the various kinds of coal are mixed in suitable proportions and crushed to the required fineness for producing the coke in the usual way. The ovens are of the Coppee type. The coke is handled by means of an inclined wharf, quenching car, and belt conveyors. A low percentage of moisture will be aimed at. Provision is made for crushing the larger pieces of coke, after which it is screened and the oversize loaded into cars and transported to the coke bins at the blast furnaces.

A complete by-product plant has been erected for the production of tar, sulphate of amomnia, and benzol. The surplus coke-oven gas, as far as it is not required for heating the ovens, will be sold to outside customers and the balance fired, together with the blast-furnace gas, under the boilers in the power house.

Operations will be started early next year with one blast furnace for the time being and a corresponding battery of coke ovens. The product will include the foundry and hematite pig iron and high-manganese pig iron.

F. J. Ryan & Co., Philadelphia, has booked a contract to design and furnish a complete heat treatment plant with capacity for treating the entire product of the Rickenbacker Motors Co., Detroit. The Ryan company also is building a complete heat treating establishment at the new plant of the Standard Roller Bearing Co., Plainville, Conn. It also has booked a contract to furnish complete oven equipment at the plant of the Bosch Magneto Co., Springfield, Mass., for baking armatures and commutators for Essex and Hudson cars.

Truing Diamonds Mounted by Casting

BY HOWARD MILLER

THE correct setting of diamonds for truing abrasive wheels is essential and important. Incorrect setting probably is responsible for the loss of more stones than any other cause. A correct setting of any stone involves two major phases. First, the stone must be placed so that the best cutting point is used, included in which is a proper orientation of the stone to minimize shattering. Second, the stone, with the exception of the small point exposed for use, should be securely anchored. Many schemes have been developed for mounting diamonds and there are a number of successful methods in daily use. Each method requires expert knowledge which is gained only by experience.

This always is true of the correct placing of the stone which constitutes the greatest problem in setting. The mechanical operation of anchoring the stone also is important and in this article is described a method which will interest everyone using diamonds. It is evident that the most secure mounting is that in which the diamond is entirely surrounded by a relatively hard, tough material, impervious to the heat generated during the wheel truing process. This, of course, necessitates the pouring or tamping around the diamond of a material having a sufficient degree of fluidity to conform to the contour of the stone. It usually has been done with molten metal or mercury amalgams. The use of molten metal, especially the operations known as brazing where brass is used,

FIG. 1—CONVENIENT ELECTRIC FURNACE FOR MOUNTING DIAMONDS BY CASTING

subjects the diamond to excessive temperature with the possibility of doing harm to the stone, unless great care is exercised. The use of lower melting point alloys, therefore, is recommended.

In the method to be described, the diamond, held by supporting wires, is placed in the bottom of a split mold similar to a bullet mold. The mold and stone then are slowly heated to about 350 degrees Fahr. The mold then is poured full of molten alloy which has previously been melted in the small electric furnace, shown in Fig. 1. The alloy used consists of:

Component	Per cent
Zinc	90
Copper	5
Aluminum	5

This alloy has a melting point of about 650 degrees Fahr., and a Brinell hardness of about 78. Its relatively low melting point permits casting at a temperature that will not injure the stone and provides a material sufficiently strong and hard to hold the diamond properly.

In developing the use of this alloy, known as Sampson metal, a number of different alloys were tested, especially those of the aluminum series. These were first suggested because aluminum has a somewhat lower melting point than brass. It was soon found that stones set with pure aluminum loosened and chattered after being used for a short time and on cutting open the nib, it was noted that air pockets had developed at the rear of the diamond which caused it to become loose. This was mainly attributed to the diamond having floated slightly when the aluminum was poured into the nib. Use was made of the bullet mold previously mentioned and the diamond was anchored se-

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curely in the bottom of the mold by a copper wire. Better results were obtained, but still the diamond loosened slightly, apparently due to the characteristic softness of pure aluminum. A copper hardened aluminum then was tried and the results were more satisfactory. However, the melting and pouring characteristics of the aluminum alloys are somewhat critical especially in such small castings. Efforts then were directed to the zinc series. The best results have been obtained with the previously mentioned alloy and it is believed that the relative ease with which it can be melted and poured, together with its fair degree of hardness, recommends it for this class of work. Fig. 2 shows sections of diamond settings made with this alloy. It will be noted that the diamond is firmly imbedded in the nib.

The furnace shown in Fig. 1 is built of fire brick and refractory cement. It is constructed to hold a small graphite crucible. Two carbons are inserted through the refractory wall, one from each side and a compensated arc is drawn between the crucible and the electrodes which quickly melts the metal in the crucible.

Production Stimulated by Equipment Invention

By making possible a considerably larger production per employe, the inventive genius of America has been a tremendous stimulation to industrial production in many lines, including iron and steel, it was pointed out in an address by Julius H. Barnes, president of the Chamber of Commerce of the United States, at the annual meeting of the American Economic association and the American Statistical association, recently.

While inspired invention is the product of no single nation or people, yet invention, Mr. Barnes declared, requires the support of quick and sure and large reward for successful consummation. The structure of American industry, he added, and its adaptability to new invention, as well as the readiness of the American consumer to welcome new devices, hold out the sureness of generous reward for superior inventive ability.

Mr. Barnes cited typical industries in which inventions have enlarged to a remarkable degree the production per worker. In the iron and steel industry, he said, one or two men now with unloaders, replace 12 to 20 men unloading by hand. In furnace charging, by the use of skip hoist, larry car and automatic weigher, two men replace 14. In pig casting, seven men with casting machine replace 60. In open-hearth operation, one operator with charging machine replaces 40 hand chargers. With traveling cranes, 12 men pouring, replace 37. Two men unloading pig iron with electric magnet and crane replace 128.

The tendency to enlarge production extends through all industry, from foundry work and material handling to bread making and the manufacture of books. "It extends even into office equipment, where adding and calculating and bookkeeping machines expand human service three and five and 10 times," he said. "It extends into agriculture, which does not lend itself so readily to machine production. The old standard of farm plowing of one man, one acre per day, has been displaced on a Montana farm adapted to tractor plowing, with the result of 22 acres per man daily."

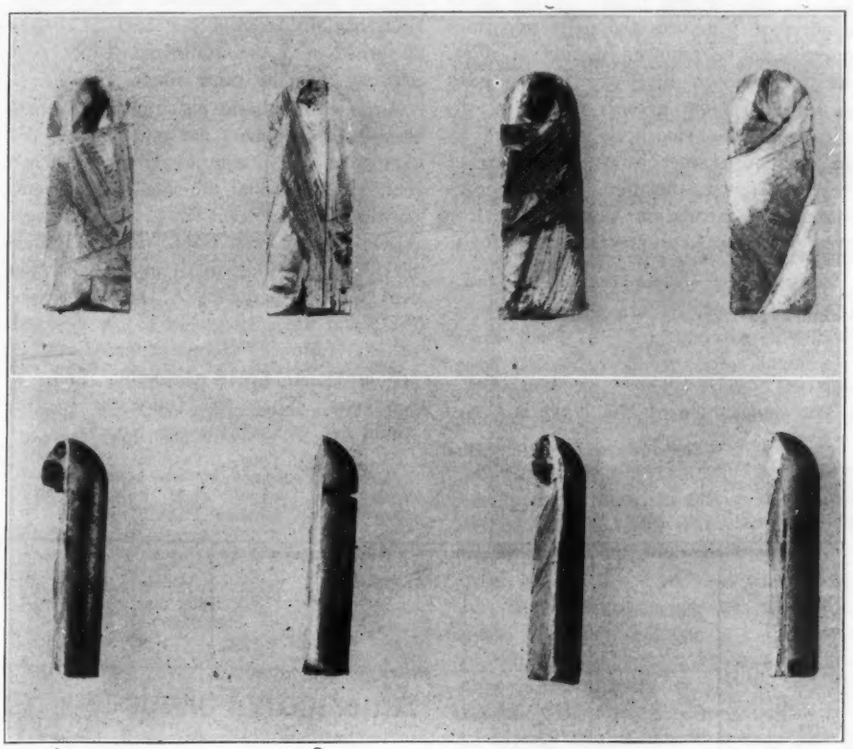


FIG. 2—TYPICAL DIAMOND NIBS SAWED IN SECTIONS TO ILLUSTRATE HOW THE STONES WERE ANCHORED IN PLACE SECURELY

German Cartel, Selling Ended by Decree

A decree issued by the German chancellor more than a month ago, which terminates the license of German cartels and other combinations to fix prices at home and abroad at the will of the majority of the constituent members, resembles in many respects the Sherman anti-trust act in this country, according to views expressed to the department of commerce by Trade Commissioner Arthur J. Grey, at Berlin. The decree was issued by the chancellor under the empowering act which gave him dictatorial power.

Under the terms of the decree, a cartel court is created, the presiding judge of which is appointed by the German reich. No appeal from the decisions of the cartel court is given and they are considered binding in other courts. The minister of economics supervises the execution of the law, under which all contracts and resolutions regulating the production, distribution and sale of commodities must be in writing and must be approved by the minister. When, in his opinion, the contract or resolution is contrary to national economic interests or the public welfare, he can apply to the cartel court for nullification of such contract and an injunction restraining the offending parties from any acts in enforcement of its terms.

In the machine building industry, where the cartel system for many years furnished the groundwork of both production and export selling efficiency, the new law probably will work some radical changes. The extensive export trade in machinery developed before the war was acquired in a large measure through the collective efforts of the machine builders operating through the cartels.

"The law furnishes another instance of the gradual recasting of the traditional German foreign trade policy," says Trade Commissioner Grey. "This, together with the abandoning of the old advertising methods, should be taken into consideration by those confronted with the problem of German competition."

How Silica Affects Cost of Iron

Great Variation Shown in Values of Iron Ore, Although Prices Based on Customary Tables May Be the Same—A Method Suggested for Scientific Determination, According to Results Obtained in Furnaces

BY T. T. READ, T. L. JOSEPH and P. H. ROYSTER

IN A preliminary study of the beneficiation of iron ores conducted by the bureau of mines, one of the authors found it necessary to ascertain, if possible, how much effect a decrease in the silica content of an iron ore has upon the cost of making pig iron. In the beneficiation of iron ores the most important impurity to be removed usually is silica, and the amount that can be expended on a beneficiation process to reduce the silica content obviously is determined by the amount of increase in the value of the ore after beneficiation. For the purpose of the calculation, assume three iron ores of natural composition as follows:

	No. 1 per cent	No. 2 per cent	No. 3 per cent
Fe	51.3	49	49
Moisture	11	11	15
Manganese	0.7	0.7	0.7
Al_2O_3	2.5	2.5	2.5
SiO_2	8.0	12.0	8.0
CaO	0.50	0.50	0.50

The composition of No. 1 ore is almost exactly the average of all shipments from the Lake Superior district in 1918, and corresponds closely to the 1922 average of low-phosphorus nonbessemer ore, which amounts to 60 per cent of the total shipments. Ore No. 2 differs from No. 1 only in that the additional 4 per cent of SiO_2 has displaced 4 per cent of Fe_2O_3. In ore No. 3 the additional 4 per cent moisture has the same effect.

Assume that basic pig iron made from these ores contains 1 per cent silica, 1 per cent manganese and 4 per cent carbon monoxide; and that the slag has the composition 35 per cent SiO_2, 15 per cent Al_2O_3, 50 per cent CaO. It is assumed that the limestone used analyzes 53 per cent CaO, 1 per cent Al_2O_3, 2 per cent SiO_2, and the coke yields 12 per cent ash of the following composition: CaO, 20 per cent; Al_2O_3, 18 per cent; SiO_2, 50 per cent. Then the following weights would be required for ore No. 1:

	Total pounds	CaO pounds	Al_2O_3 pounds	SiO_2 pounds
Ore	4,100	20	103	328
Coke	2,100	50	45	126
Limestone	1,000	530	10	20
	7,200	600	158	474

The furnace in making a ton, 2240 pounds, of pig iron, would make 1200 pounds of slag; a little lower in Al_2O_3 and higher in CaO than was assumed, but near enough for purposes of calculation. The MnO and FeO in the slag are neglected. The SiO_2 in the slag is 35.8 per cent after allowing for the 47 pounds of SiO_2, which yields the silica for the pig iron.

For ore No. 2, the following weights would be required:

	Total pounds	CaO pounds	Al_2O_3 pounds	SiO_2 pounds
Ore	4,300	22	108	516
Coke	2,325	56	50	140
Limestone	1,400	742	14	28
	8,270	820	172	684

This yields 1630 pounds of slag, which is somewhat lower in Al_2O_3 and higher in SiO_2 than desired, as it contains 39 per cent SiO_2, allowing for the silica which has gone into the pig iron. The total of silica plus the alumina is a little

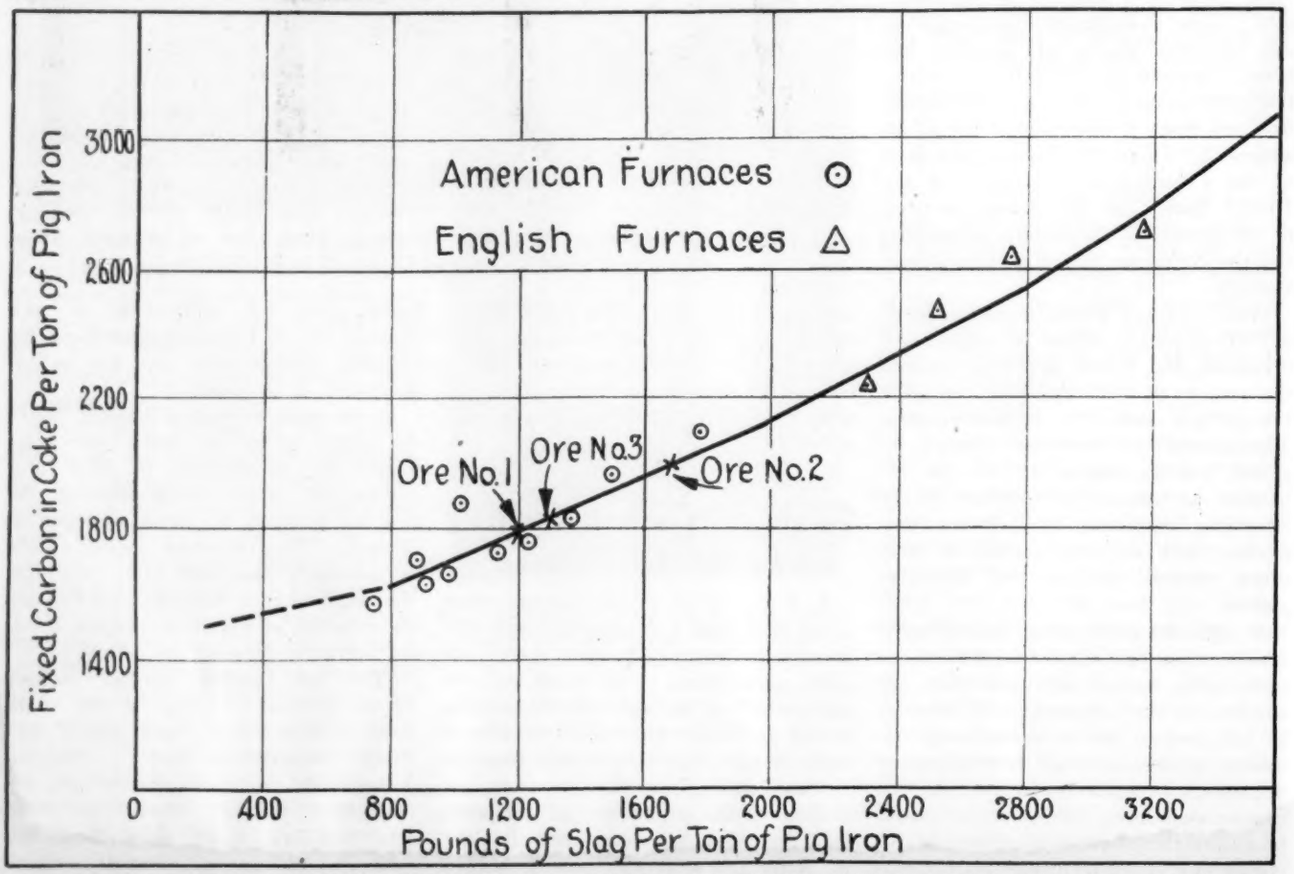


FIG. 1—CURVE SHOWING RELATION BETWEEN SLAG VOLUME AND FIXED CARBON IN THE COKE, PER TON OF IRON MADE IN 30 BLAST FURNACES

T. T. Read is superintendent, north central experiment station, United States bureau of mines, department of interior. T. L. Joseph is associate metallurgist, and P. H. Royster, assistant metallurgist, bureau of mines.

less than the 820 pounds of lime, however.

During the course of the blast furnace investigation, which has been in progress at the north central station of the bureau of mines since 1919, operating data have been collected from a sufficient number of furnaces to give a cross section of present practice, using lake ores. Fig. 1, a curve showing the relation between slag volume and fixed carbon in the coke per ton of metal made, indicates that each additional pound of slag requires 0.45 pound of fixed carbon, equivalent to 0.52 of a pound of coke (86 per cent fixed).

How Curve Was Developed

This curve was obtained by arranging 30 furnaces in the order of increasing slag volume, the independent variable, and dividing them into groups of three. Each point on the curve, therefore, represents the average of a group of three furnaces. Values for carbon, rather than coke, have been chosen to take account of the variations in the fixed carbon in the fuel. The authors realize that coke consumption and slag volume are only two of the factors entering into the operation of a blast furnace, and that the others must also be taken into consideration.

It is evident from the values for slag volume and carbon per ton of metal that the relationship is not a smooth one; nevertheless, an increase of carbon for the higher slag volume is obvious. The variations in other factors, such as blast temperature, top temperature, silicon in the metal, hearth diameter, and rate of blowing expressed in pounds of coke burned per square foot of hearth area per minute, seem, except in the case of rate of blowing, to offset each other as indicated by the following comparison of the furnaces having low and high slag volumes:

	Furnaces with low slag volumes:	Furnaces with high slag volumes:
Top temperature	313°F.	288°F.
Blast temperature	1013°F.	1004°F.
Silicon in metal	1.30	1.59
Hearth diameter	16′ 10″	15′ 10″
Pounds coke per min. per sq. ft. hearth area	3.08	3.44

Fourteen English furnaces, as given by Fred Clements, before the British Iron and Steel institute, the only ones available having slag volumes, have been plotted to get an idea of the slope of the curve in the range of high values. Although the need of more data covering the whole range is recognized, the curve shown seems to be the best interpretation of the values from 30 American and 14 English blast furnaces. English practice shows a wider variation than American. Top temperature, blast temperature, silicon in the metal, hearth diameter, and coke per square foot of hearth area per minute compared as follows when English furnaces are grouped according to low and high slag volumes:

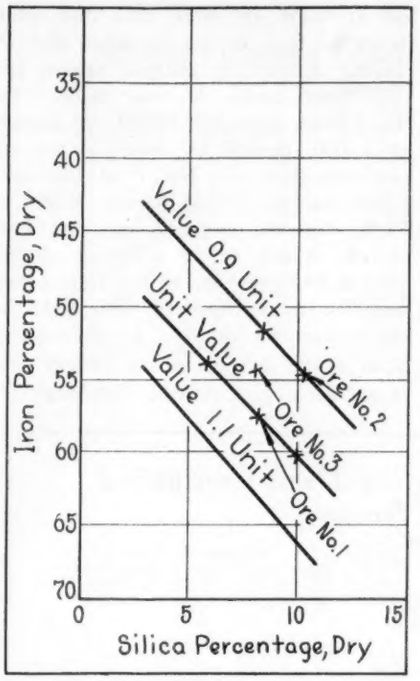


FIG. 2—CHART SHOWING RELATIVE VALUE OF DIFFERENT GRADES OF ORE AS INDICATED BY THE SILICA-IRON RATIO 57.2 PER CENT DRY (51.5 PER CENT NATURAL) IRON, AND 8 PER CENT SILICA AS UNIT VALUE

	Furnaces with low slag volumes:	Furnaces with high slag volumes:
Top temperature	495°F.	410°F.
Blast temperature	1169°F.	1335°F.
Silicon in metal	1.44	1.76
Hearth diameter	12′ 1″	10′ 11″
Pounds coke per min. per sq. ft. hearth area	3.17	3.05

While the curve shown in Fig. 1 seems to hold for practice on lake ores and also for a group of English furnaces, it does not follow that the shape of the curve would not be altered for practice on eastern magnetites or in the southern district where other factors of considerable magnitude must be taken into account. The authors recognize the need of more information on this point but believe that a curve taken from actual operating data is a better guide than purely theoretical values. This curve indicates that for 1630 pounds of slag volume, 1925 pounds fixed carbon, or 2325 pounds of coke of 86 per cent fixed carbon would be required, which is the figure used in the computation.

Assume for purposes of computation that the charge given for ore No. 1 corresponds to a furnace cost as given in Case I in the following table, and then compute the cost for ore No. 2:

	Case I	Case II
Iron-bearing material	$10.69	$10.69
Coke	6.98	7.75
Fluxes	0.70	0.98
Maintenance and repairs	0.43	0.48
Labor	0.75	0.83
Steam	0.27	0.30
Relinings and renewals	0.38	0.42
Other furnace costs	0.97	1.07
Total	$21.17	$22.52
Less credits	0.61	0.68
	$20.56	$21.84

The cost figures for Case I are not arbitrarily assumed figures, but are the average costs of five representative companies making basic pig iron for 11 months of 1918, as reported to the federal trade commission.

As a composite price of pig iron on Dec. 11, 1923 was $21.88 and the foregoing figures are only operating costs, without any allowance for overhead, the total cost seems to be about right for present conditions, but since the coke cost is the principal item in increased cost due to silica, and coke prices vary considerably, a more accurate determination of the increased cost than is here attempted should be based on average coke prices. As we are only attempting to obtain an approximation to relative value the approximate cost figures will serve our purpose.

Comparing the weight required to make a ton of basic pig iron from ore No. 1 and ore No. 2, respectively, we have to allow for a 10.75 per cent increase in the coke costs and 40 per cent increase in cost of fluxes. Assume that the same amount of coke will be burned by the furnace per day in Case II as in Case I, then if the furnace makes 500 tons of pig iron and 268 tons of slag per day with ore No. 1, it will make 452 tons of pig iron, and 329 tons of slag per day from ore No. 2. The labor cost per day will be the same, therefore, it will increase 10.75 per cent per ton. Just what the effect will be on maintenance and other furnace costs is not so easy to determine, but we probably will not be far wrong in assuming that they also increase in the same ratio. In this computation it is assumed that all the iron-bearing material charged into the furnace is ore, and that it is paid for at the same rate per unit of iron in each case. It then appears that a ton of pig iron made from the second ore will cost $1.28 more than if made from the first ore, or 32 cents per additional unit of silica. Some blast furnace operators estimate that 30 cents per unit of silica represents the additional cost, which checks closely with the foregoing computation.

Operating Questions Are Raised

The question may be raised as to whether the furnace could not be driven faster on the second ore so that the furnace still would make 500 tons of pig iron per day. This not only raises the question as to whether the cost for repairs, relining, etc, is not proportional to the total tonnage smelted, but also the question as to why the furnace

could not be driven faster on the first ore. Therefore it seems better to adhere to the original comparison.

No allowance has been made for the cost of disposing of the increased slag. The cost of slag disposal varies and in some cases is high, over 70 cents per ton in one case. To dispose of 1630 pounds of slag as compared to 1200 pounds of slag per ton of pig iron would in that case add 14 cents to the cost of a ton of iron. In the absence of average figures as to the cost of slag disposal it is necessary to pass over this factor.

As the pig iron made from the second ore is worth no more than that made from the first ore, the increased cost of making it must be charged against the ore from which it was made. As the furnace man paid $10.69 for enough ore, 4100 pounds to make a ton of pig iron from ore No. 1 he can only afford to pay $10.68 minus $1.28, or $9.40, for the required quantity 4300 pounds of ore No. 2. This is at the rate of $4.89 per ton at the furnace for ore No. 2 as compared with $5.84 at the furnace for ore No. 1. Subtracting $1.33 as the average actual freight rate from Lake Erie port to the Pittsburgh district. which is a fair approximate figure, gives a value of $4.51 per ton for ore No. 1 at the lake port and $3.56 per ton for ore No. 2 at the port. According to the commonly used tables of general ore values for 1923, which are almost exactly the same as those for 1918, ore No. 1 is valued at $5.55 per ton at lower lake port while ore No. 2 is valued at $5.19 per ton. Now $5.19 is 93.5 per cent of $5.55, while $3.56 is only 79 per cent of $4.51. In other words the furnace calculations indicate that ore No. 2 has only 79 per cent of the value per ton of ore No. 1, while the tables indicate that its value is 93.5 per cent of the value of No. 1. Neglecting to take account of the increased cost of the pig iron made from the ore with the higher silica causes it to be rated nearly 14 per cent above its real value.

Consider next ore No. 3 which has the same percentage of iron natural as ore No. 2, but has 4 per cent more moisture and 4 per cent less silica. It is evident that there are as many actual pounds of iron in a ton of ore No. 3 as there is in a ton of ore No. 2, and from the standpoint of iron content both are of equal value. But the ratio of silica to iron is lower. In No. 2 the ratio is 8 divided by 49, equals 0.1633, while in No. 2 it is 12 divided by 49 equals 0.245. In No. 1 it is 8 divided by 51.3 equals 0.1559. It is obvious that while it will cost more to make a ton of pig iron from ore No. 3 than it will from No. 1, it will not cost as much as it will to make it from No. 2. In other words, No. 3 is worth more than No. 2, although the values deduced from the standard tables are the same. This is the same as saying that 4 per cent additional water is penalized as much as 4 per cent additional silica.

Furnace Stock Sometimes Sprinkled

The additional silica increases the cost of smelting, the water does not, because it is evaporated off at the top of the furnace by heat that would probably be uselessly radiated into the air. Furnace men attached so little weight to moisture in the furnace burden that in some places the stock is sprinkled with water to keep down dusting. It might be argued that increased moisture is advantageous in keeping the top of the furnace cooler, although it adds to freight and handling costs.

Calculating the cost of making a ton of pig iron from ore No. 3 as was done for ore No. 2, it appears that 4300 pounds or ore No. 3, 2125 pounds coke, and 1060 pounds limestone would be required and 1250 pounds slag would be made per ton of iron. The coke requirement only increases 1.2 per cent instead of 10.7 per cent. The flux cost

Blast Furnace Operating Data Compared

American Furnaces

No. of furnaces	Slag volume	Carbon, tons	Average for Group 1
Group 1			
25	753	1,661	Blast temp. 1015 degrees Fahr
12	784	1,625	Top Temp. 331 degrees Fahr.
4	798	1,502	Si in metal, 1.42.
Average	788	1,596	
Group 2			
			Average for Group 2
33	852	1,728	Blast temp. 959 degrees Fahr.
9	907	1,720	Top. temp. 268 degrees Fahr.
6	905	1,645	Si in metal, 1.37
Average	888	1,697	
Group 3			
			Average for Group 3
2	911	1,518	Blast temp. 1030 degrees Fahr.
15	921	1,685	Top temp. 325 degrees Fahr.
10	943	1,678	Si in metal, 1.28
Average	925	1,627	
Group 4			
			Average for Group 4
49	977	1,624	Blast Temp. 991 degrees Fahr.
24	978	1,745	Top Temp. 318 degrees Fahr.
11	985	1,631	Si in metal, 1.15
Average	980	1,667	
Group 5			
			Average for Group 5
20	1,012	1,845	Blast Temp. 1071 degrees Fahr.
48	1,034	1,946	Top temp. 315 degrees Fahr.
26	1,061	1,907	Si in metal, 1.30
Average	1,036	1,899	
Group 6			
			Average for Group 6
16	1,062	1,720	Blast temp. 917 degrees Fahr.
22	1,110	1,800	Top temp. 387 degrees Fahr.
17	1,161	1,641	Si in metal, 1.02
Average	1,111	1,720	
Group 7			
			Average for Group 7
30	1,212	1,700	Blast temp. 1142 degrees Fahr.
31	1,216	1,785	Top. temp. 428 degrees Fahr.
29	1,238	1,732	Si in metal, 1.4
Average	1,222	1,739	
Group 8			
			Average for Group 8
1	1,366	2,090	Blast temp. 1095 degrees Fahr.
35	1,373	1,560	Top temp. 398 degrees Fahr
3	1,389	1,765	Si in metal, 1.35
Average	1,376	1,805	
Group 9			
			Average for Group 9
5	1,467	1,763	Blast temp. 953 degrees Fahr.
40	1,504	2,082	Top temp. 232 degrees Fahr.
39	1,505	1,982	Si in metal, 2.18
Average	1,492	1,942	
Group 10			
			Average for Group 10
41	1,616	2,084	Blast temp. 917 degrees Fahr.
27	1,676	1,822	Top temp.
44	2,070	2,350	Si in metal, 1.99
Average	1,787	2,085	

increases only 6 per cent. The calculated increase in smelting cost would be 14 cents per ton of pig iron; or 4300 pounds or ore No. 3 is worth 14 cents less than 4100 pounds of ore No. 1, whereas 4300 pounds or ore No. 2 is worth $1.28 less than 4100 pounds or ore No. 1. By the standard table, however, No. 2 and No. 3 are of equal value.

Improved Method Is Suggested

It is clear from the foregoing that a method of computing the value of an iron ore from its natural iron content alone, without considering variations in the silica content, does not give the true relative values of the ores. As a possible improved method the following is suggested: On the chart, Fig. 2, iron percentages, dry, are plotted as ordinates and silica percentages are plotted as abscissas. In a 57.2 per cent dry (51.5 per cent natural for 10 per cent moisture) iron ore, one unit of iron is worth about 10 cents, and one unit of silica increases the smelting cost about 30 cents per ton of pig iron, or 15 cents per ton of ore. Therefore the scale for the silica ordinates is made 1½ times the iron scale.

Taking a 57.2 per cent Fe and an 8 per cent SiO_2 ore as of standard or unit value, an increase of 3 units of Fe would increase the value 30 cents and an increase of two units of silica would decrease the value 30 cents, consequently a 60.2 per cent Fe, 10 per cent SiO_2 ore would be of unit value and a 54.2 per cent Fe 6 per cent SiO_2 ore would also be of unit value.

Drawing a line through the points and extending it gives all the possible combinations of iron and silica that are of unit value. Similarly a 51.5 per cent Fe, dry, 8 per cent SiO_2 ore would have a value of nine-tenths of the unit value. Drawing a line through this point parallel to the first line it will pass through all the combinations of iron and silica that give a value of 0.9 times the unit. In the same way a 62.9 per cent Fe, dry, 8 per cent silica ore would have a value of eleven-tenths of the unit. A parallel line drawn through this point would indicate all the combinations of iron and silica that have a value of 1.1 times the unit.

Relative Values Quickly Determined

By drawing a sufficient number of such lines it becomes possible to determine instantly from the chart what the relative value of any given combination of iron, dry, and silica percentages is as compared to the unit value. Multiplying this by the current market price for the base ore would give the indicated relative price of that ore as compared to the base. What price a buyer would offer for the ore would depend, of course, not only on its relative silica-iron value but also on a variety of other conditions, such as its physical characteristics.

It also is necessary to take into account the variations in lime-magnesia and alumina in the ore. This could be done by constructing a chart in which the cumulated percentages of bases and acids are plotted against each other, giving a series of curves that might be called "effective silica in the ore," and this value could be used in Fig. 2, instead of the actual silica percentage.

A further advantage of the suggested method of using one or more charts to indicate the relative values of different grades of ore instead of the tables of prices now in use is that it indicates clearly that what is shown by the chart is only relative value and that the actual price paid is reached by discussion between the buyer and seller in which a variety of other considerations are also taken into account, whereas a possible though erroneous inference from the table of "general prices" would be that the indicated price must necessarily be paid for ore of the indicated iron content.

Furthermore, the existence of tables of prices that do not indicate correct relative values would seem to be a hindrance rather than a help in negotiations leadings to a price agreement which is fair to both buyer and seller, which is the foundation of sound business. Additional light is needed on various problems, such as, for example, the true relative value of the ores that contain over 15 per cent silica, which are desirable under certain circumstances.

Blast Furnace Operating Data Compared

English Furnaces

No. of furnaces	Slag volume	Carbon, tons	
		Group 1	
1	1,232	1,766	Average for Group 1
2	1,232	1,702	Blast temp. 1267 degrees Fahr.
3	1,232	1,881	Top temp. 533 degrees Fahr.
Average	1,232	1,783	Si in metal 1.92
		Group 2	
4	1,905	2,030	Average for Group 2
5	2,462	2,060	Blast temp. 1140 degrees Fahr.
6	2,520	2,575	Top temp. 550 degrees Fahr.
Average	2,295	2,222	Si in metal, 1.19
		Group 3	
7	2,520	2,596	Average for Group 3
8*	....	....	Blast temp. 1207 degrees Fahr.
9	2,548	2,370	Top temp. 362 degrees Fahr.
Average	2,534	2,483	Si in metal 1.61
		Group 4	
10	2,742	2,710	Average for Group 4
11	2,800	2,520	Blast temp. 1375 degrees Fahr.
12	2,800	2,631	Top. temp. 575 degrees Fahr.
Average	2,781	2,620	Si in metal, 0.71
		Group 5	
13	3,042	2,786	Average for Group 5
14	3,181	2,654	Blast temp. 1375 degrees Fahr.
15	3,359	2,786	Top temp. 331 degrees Fahr.
Average	3,194	2,742	Si in metal, 2.55

*Omitted because some factor, other than slag volume, had a marked effect upon coke consumption. Two other furnaces omitted for the same reason.

Use Labor Saving Devices in Clearing Tokyo

According to a statement issued by the Far East division of the United States department of commerce, one of the noteworthy developments that have taken place in Japan following the recent disaster has been the large scale introduction of more modern labor saving devices, such as automobile trucks, steam shovels, and other mechanical devices designed to take the place of human labor. The necessity for quick action and the lack of manual labor were largely responsible for this move. Contrary to popular opinion, Japanese day labor never has been plentiful or, in late years, cheap. The speed and efficiency with which the debris was cleared away has been an eye opener to the Japanese, and the effects of this innovation should be far reaching; and may cut the gordian knot of high wages and high production costs in industry, at the same time opening a market for automatic machinery.

As soon as the streets were cleared and material was available, temporary structures were put up with amazing speed. The metropolitan police board reported that they were going up at the rate of 1800 per day during October, and that at the end of that month the total number in Tokyo

amounted to 92,807, half of the number destroyed. The majority of these temporary buildings were small, sufficient to hold but one family, but a good number of them took the form of barracks, each of which is capable of sheltering a good number. As nearly one-third of the population were killed or have moved away, Tokyo should be fully housed shortly. The construction of temporary shelters will continue for some time to come, however, as the former residents are returning to Tokyo at the rate of 6800 per day and will have to be steadily provided for.

It is reported that land values have taken a considerable drop throughout the city since the earthquake. Land quoted at 1000 yen per taubo (about 36 square feet) prior to the disaster, is now being appraised at around 200 yen, since improvements have been destroyed. This fact will make it easier for the reconstruction board to carry out condemnation for street and park plans.

New Officers Elected by Automotive Engineers

H. M. Crane has been elected president of the Society of Automotive Engineers for the year 1924, and he assumes his duties following the annual meeting of the society at Detroit, Jan. 22-25. Mr. Crane is technical advisor to the General Motors Co. E. A. Johnston has been elected first vice president. Second vice presidents have been elected as follows: W. R. Strickland, representing motor car engineering; J. F. Max Patitz, representing tractor engineering; H. L. Hope, representing aviation engineering; T. B. Fordham, representing stationary internal-combustion engineering; and W. C. Ware, representing marine engineering. C. B. Whittlesey is treasurer and H. W. Alden is past president.

Councillors elected for 1924 are J. H. Hunt, A. K. Brumbaugh and M. P. Rumney. Those who served during 1924 are W. A. Chryst, F. W. Gurney and A. J. Scaife.

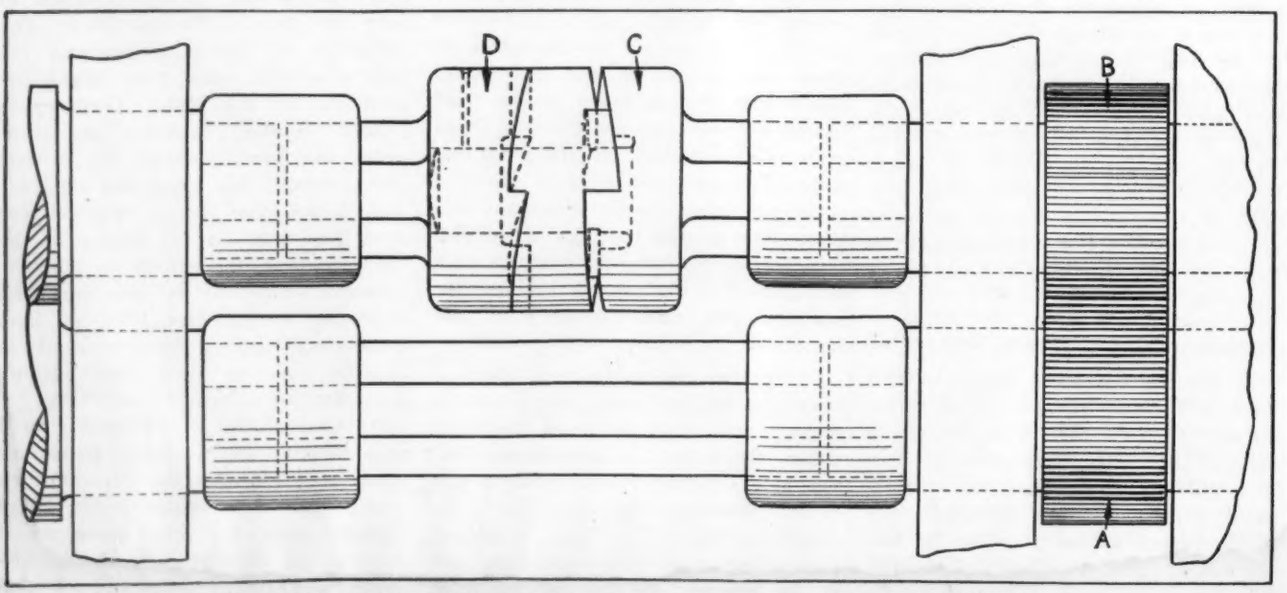
Top Roll Driven Through Frictional Coupling

A new type friction coupling has been designed by Frank E. Flynn, assistant manager, strip steel department, Weirton Steel Co., which is applicable to frictionally driven rolls using the regular spindle. The coupling also can be applied to a slitting shear running in combination with rolls, in which case the rolls can be operated at two or three times the speed of the shear. When rolling a long strip of steel the shear will become disengaged and run the same speed as the rolls. The coupler also can be applied to a slitter equipped with a reel, or to feed rolls where the mill rolls operate 400 to 1000 feet or where it is necessary to operate the feed rolls slowly to feed the steel into guides.

In the case of a rolling mill installation as shown in the accompanying illustration a pinion, *A* is mounted on the drive for the bottom roll and meshes with a pinion, *B*, mounted on an overlying countershaft which is coupled to an aligned stem by an ordinary coupling box. The stem terminates in a head designated as *C* in the illustration. Coupled to the wabbler of the upper roll also is a stem having a head *D*. As is apparent both heads face each other but are spaced apart a suitable distance. Fitted in a socket in head *C* is a spindle which has its opposite end received loosely in a centrally located socket in the other head *D*. A clutch member is mounted rotatably on the spindle between the two heads.

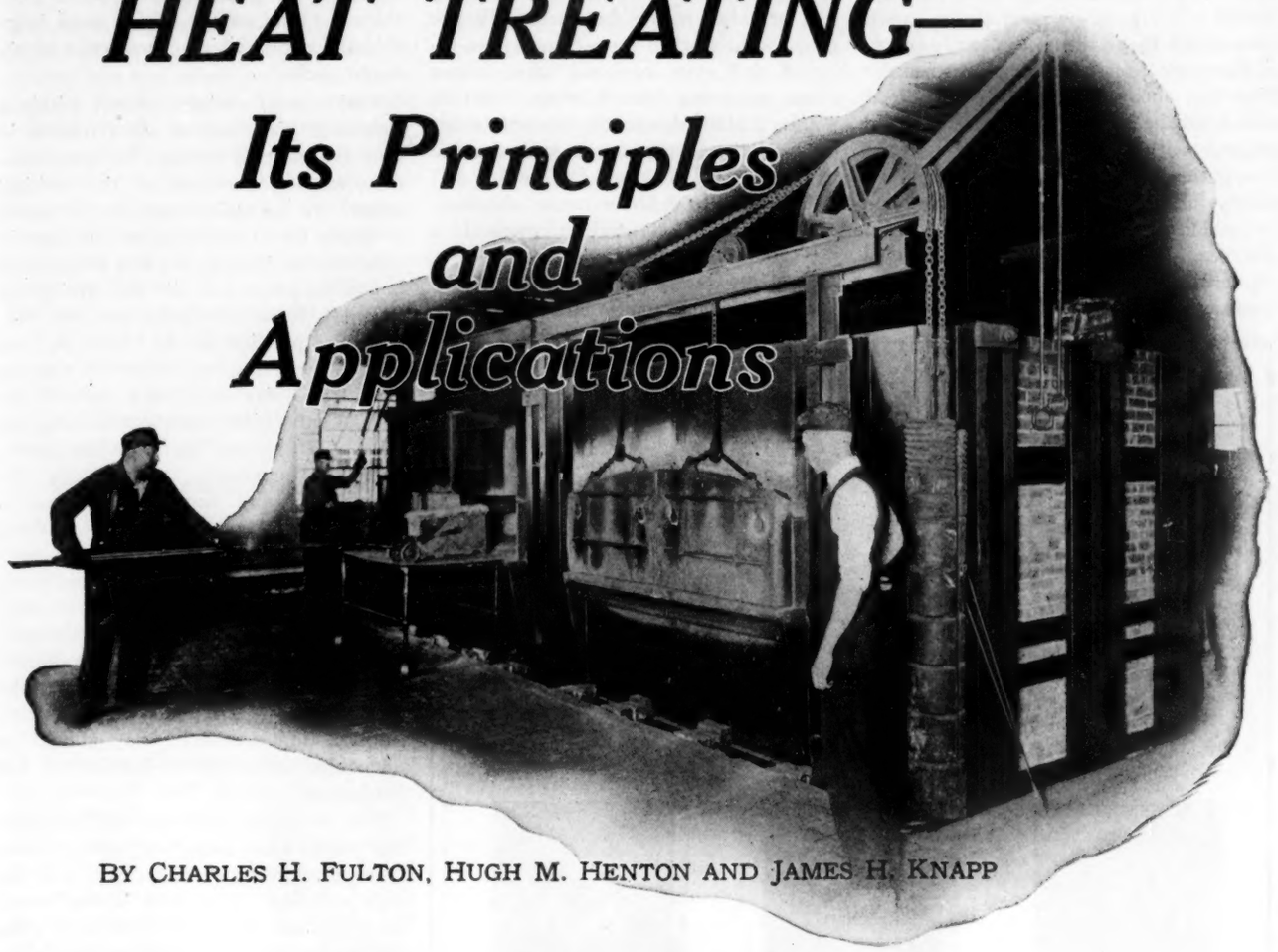
The face of head *D* is machined with radially extending shoulders which face the rear in respect to the direction of travel of the roll to which it is coupled. The clutch face opposite the face of head *D* conforms in shape so that the faces assume a close fitting relation. The opposite face of the clutch member is built with a pair of radially disposed shoulders which face forwardly in respect to the direction of rotation of the roll.

The upper pinion *B* is provided with a larger number of teeth than the lower pinion *A* and therefore operates slower. As a result of this difference in speed the clutch drive remains inoperative for driving the upper roll so long as the speed of the latter is equal to that of the lower or positive driven roll. While the speed of the frictionally driven upper roll remains substantially that of the lower roll, the clutch member occupies a position on the spindle in which its shoulders are abutted by the shoulders of the head *C* and in which its opposite face is out of engagement with the confronting face of head *D*, thus permitting independent rotation. When the speed of the upper roll falls below that at which the head *C* is being driven, however, the shoulders of this head are carried forward and interlock with the shoulders of the clutch member and in this position the heads and the clutch member drive the upper roll. When friction between the two rolls again suffices to drive the upper roll at the higher speed of the lower roll, the clutch member again is kicked back to its initial position.



SIDE ELEVATION OF FLYNN-TYPE COUPLING SHOWING ITS APPLICATION TO A FRICTIONALLY DRIVEN TOP ROLL

HEAT TREATING—
Its Principles and Applications



BY CHARLES H. FULTON, HUGH M. HENTON AND JAMES H. KNAPP

Chapter V—Normalizing and Annealing

PLAIN carbon steels that require normalizing or annealing extend all through the range of solid solution from those containing no carbon up to the hardest of tool steels having about 1.8 per cent carbon. They include small and large castings, forgings, shapes, bars, plates, rods, wires, and all forms of hot and cold worked materials. In a measure, the methods used apply to raw ingots, blooms, and billets. Not a little confusion in terms has arisen, but herein normalized steels are those cooled in air or its equivalent, while annealed steels are furnace-cooled or its equivalent. By "its equivalent," is meant that small pieces are air-cooled, and large pieces cooled by such means that an equivalent effect is obtained. The same applies in the case of furnace-cooled stock.

It is obvious that factors other than size, temperature, and rate influence normalizing and annealing procedure. Among the additional factors are structure at start, carbon content, physical properties desired, furnace and temperature possibilities, time necessary, mechanical handling, human execution, pyrometer control, fuel effect upon furnace atmosphere, shape, quantity, and cost all told. All of these are interrelated and apply to all heat treatment in greater or less degree. Each plays a part and the greatest efficiency in obtaining the structure desired comes when as many as possible of the variables in the list are eliminated.

The structure and nature of the original piece are the first to receive consideration. Castings entail a different temperature and time requirement than forgings; cold-worked steels should not be annealed with hyper-eutectoid tool stock; hardened steel requires a change from screw-stock procedure; and spheroidizing of Gillette razor blades is a fine art in itself.

Castings are composed of the micro-constituents ferrite and pearlite, or more rarely pearlite or pearlite and cementite. The ferrite separates slowly from the austenite, as the castings cool very slowly, and forms in large grains around the patches of pearlite, weakening the structure. The angular appearance of the cast steel pearlite as shown in Figs. 34 and 35 in this issue and in Figs. 36 and 37 to appear in the next installment, with the acute angles pointing toward the center of the casting, also gives a weakening effect. The clean cut lines at the boundary between ferrite and pearlite almost make one think that the strong, amorphous cement is lacking. The pearlite granulations and pearlite patches

Methods of Normalizing and Annealing

NORMALIZING and annealing are treated in detail in Chapter V, the first installment of which appears in this issue. The accompanying text deals largely with the microstructure of steel at different temperatures, this being the basis for the practical information on furnace operation and annealing routine presented later in the chapter.

Chapter I of the series appeared Oct. 4; Chapter II was published in the issues of Oct. 18, Nov. 1 and Nov. 15; Chapter III in the issues of Nov. 29, Dec. 13 and Dec. 27; and chapter IV in the issue of Jan. 10.

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are brought out under a higher magnification. They grow very large, until sometimes they take in the whole patch.

Forgings present a microstructure like that shown in Fig. 12, Chapter II when finished below the lower critical point, with bandings showing the elongation of the ferrite grains particularly, and also indicates somewhat the extension of the pearlite granulations in patches. But when finished at or above the critical point, they show a fine grain equiaxed like the third upper photomicrograph reproduced in Fig. 34. The hot forging treatment works the grain down to a small size and this tendency is inherited by the ensuing pearlite and ferrite grains below the critical point. This also is true of the position of the free ferrite at the grain boundaries.* The forgings which are finished too far below the lower critical point are strained and hard, and need relief by normalizing or annealing, as do forgings finished too high. The latter are coarse grained and somewhat like castings.

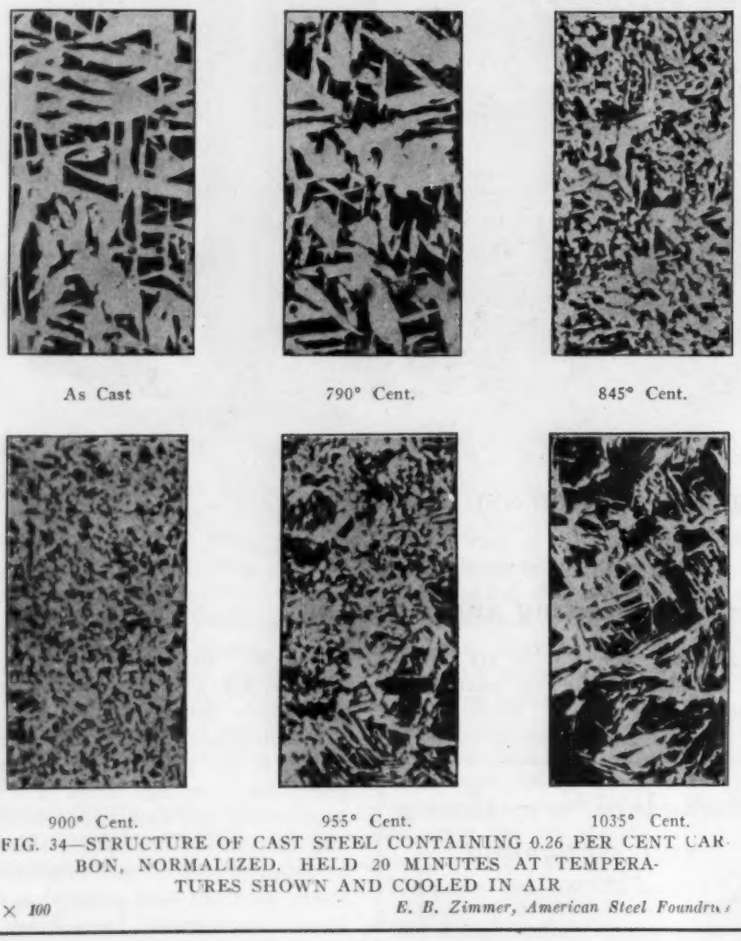


FIG. 34—STRUCTURE OF CAST STEEL CONTAINING 0.26 PER CENT CARBON, NORMALIZED. HELD 20 MINUTES AT TEMPERATURES SHOWN AND COOLED IN AIR

× 100 *E. B. Zimmer, American Steel Foundries*

Hot work upon steel carried on until the temperature has fallen below the lower critical point, Ar_1, in reality becomes cold work, in that the pearlite deformed cannot become annealed nor can the granulations become equiaxed by any heat below the Ac_1 point. Ferrite grains cold-worked do become strain-relieved and even equiaxed after severe strain on being heated below the A_1 point. This is due to the unstable character of the amorphous cement formed by cold work. The word "granulations" is here used to describe in the conglomerate pearlite what would be grains in a pure metal or solid solution.

Tool steels with their high carbon consist of ferrite cementite in slight excess over the pearlite ratio, with a large amount of more or less well-defined pearlite, sorbite, and possibly troostite, depending upon their previous history. They are often strained, corse grained, or too hard for machining until annealed.

Hardened steel often requires annealing. It has a microstructure of troostite, martensite, and in extreme cases austenite. It is hard, strong, but perhaps brittle, and must be softened, or made ductile as well as strong.

Ordinary screw stock is low-carbon steel with high-phosphorus or other impurities. It presents a real problem when it needs attention. Its segregations and inclusions of phosphide and slag, oxide, and sulphide all hinder heat transfer, and changes in grain size are slow. Screw stock is not fit for anything else, but its high phosphorus content enables it to be cut so that a good large chip is formed, which clears away nicely in the lathe.

Variation of carbon content within a particular piece causes some trouble in that the user is obliged to accommodate varying positions of the critical range. In the main. however, we expect a single lot of steel to be constant in composition, both as to parts of the same individual piece, and the different pieces in a lot. From 0.0 to 0.9 per cent carbon, the position of A_3 and A_2 are progressively lowered from 910 degrees Cent. (1670 degrees Fahr.) and 870 degrees Cent. (1414)* to about 710 degrees Cent. (1310) and therefore the corresponding maximum temperature for normalizing and annealing is lowered. The higher the percentage of carbon, the more tender the steel after fast cooling. Hypereutectoid and eutectoid steels have the Acm point raised with increasing carbon, but because of their greater tenderness, the annealing temperature cannot be raised correspondingly. The normalizing with its attendant air-cooling on thin sections has almost a quenching effect which borders on the hardening.

For maximum softness and ductility the real genuine annealing, with its slow furnace-cooling for smaller pieces, is the only solution. For these strength and elasticity are sacrificed. When on the other hand strength and a modified ductility are desired, the normalizing action on small articles and its equivalent on the large ones, fills the specifications. The effects of these treatments upon the physical properties of specific examples are taken up in detail later. Notch toughness, fatigue resistance, shrinkage, shearing, bending and endurance, electric conductivity and permeability in soft steels, abrasive hardness, cupping, and some others are sometimes made subject to test. Few tests are made at elevated temperatures.

Furnaces Should Be Studied

The design of furnaces is most important and it behooves users to examine closely the characteristics of different makes in order to select those best adapted to the work at hand. The work done in modifying the grain of steel uses up energy in the form of heat; therefore the quantity of heat units as well as temperature or heat pressure should receive attention. The capacity of the furnace, which affects directly the time element, also should be studied.

Efficiency in annealing demands not only intelligent supervision but also

*Jeffries, *Bulletin*, American Institute of Mining and Metallurgical Engineers, 1917, page 1884.

*Hereafter in this installment, for the sake of simplicity, temperatures are given first in centigrade, the second number in parenthesis designating the fahrenheit temperature. Thus: 870 degrees Cent. (1414).

good workmen to work the appliances and handle good furnaces.

One of the best devices to aid the human eye and mind in furnace operation is the pyrometer. No annealing furnace should be without one or more. In designing the furnace, care should be taken that the pyrometer is properly located and is accessible. Pyrometers must be fairly robust, and accurately calibrated and the temperature must be correctly interpreted in terms of thoughtful annealing practice.

Fuel exerts its influence upon the furnace atmosphere. A pearlite which is increasing in ferrite by decarburizing in an oxidizing furnace cannot be well and easily annealed.

Shape of Article Unimportant

The shape of the article to be annealed has an important bearing on the method of treatment.* Spheres, rounds, and sheets take time for heating approximately in the ratio 1; 2; 3; other things being equal, the surface presented being the determining factor.

Quantity in production always is important. When the mass and number of pieces to be treated is large, special care must be taken to see that all parts are heated uniformly. This is difficult to accomplish and the furnace which does succeed here is a real find.

Cost is the next consideration. Society is ever anxious to get materials at less effort per unit of quantity. However, let us not say "This is the right way to do it, but it costs more." Rather say "If this is the right way, it must be cheapest." Good work results in less spoilage, good annealing equipment effects great savings, and the best is the cheapest. Often, too, first cost is not excessive.

The best and surest aid to correct normalizing and annealing practice is examination of grain structure under the microscope. One can follow the work closely by polishing and etching a specimen and noting whether the grain size is sufficiently small, or whether pearlite or sorbite is present, or how the ferrite is mixed with the pearlite. The carbon content is easily and closely estimated by comparing annealed samples. Impurities and segregations are detected, and a speedy conclusion arrived at, to be checked later by chemical following a period of recession, the analysis and mechanical tests.

To illustrate normalizing, a series of photomicrographs is presented in Figs. 34 and 35 covering various possible treatments for a cast steel of 0.26 per cent carbon. That at the extreme left at the top in Fig. 34 shows the original cast material. All photographs are shown at 100 diameters. The specimens shown in Fig. 34 were heated slowly to the temperatures given, held 20 minutes and air-cooled. Those shown in Fig. 35 were held 20 minutes at the temperatures given, cooled in air and the operation then repeated. The pieces were half-inch cubes and surfaces were carefully polished and etched with picric acid.

Reference to the iron-carbon diagram, reproduced in Chapter III shows that 0.26 per cent carbon steels pass the Ac_2 point at 780 degrees Cent. (1432) and the Ac_3 at 845 degrees Cent. (1554). To normalize the structure we must heat past the Ac_1 to absorb pearlite into austenite, then heat past Ac_2 and Ac_3 to absorb the ferrite into the austenite. This, effectually done, will obliterate all previously existing coarse angular grain structure, like that in the "as cast" specimen, Fig. 34. When a stable structure like ferrite and pearlite of the "as cast" specimen is to be absorbed, a considerable time is taken, even for small half-inch cubes. This time for the finish of the dissolving effect is longer close above the upper critical Ac_3 than some distance above, so it is customary to heat at a safe number of degrees above and so cut down on the time of holding. In examining the structures at 790 degrees Cent. we see but little change at 100 diameters. The grain seems to be about as large as before. At 845 degrees Cent. (1554) a great change has come about. Much of the old structure has been obliterated and new small grains have appeared. The air-cooling has been fast enough to prevent any fast growth when austenite gave up its ferrite, and when the resulting austenite richer in carbon was changed into sorbite. Sorbite at 100 diameters looks like pearlite, but a higher magnification would easily distinguish the two structures.

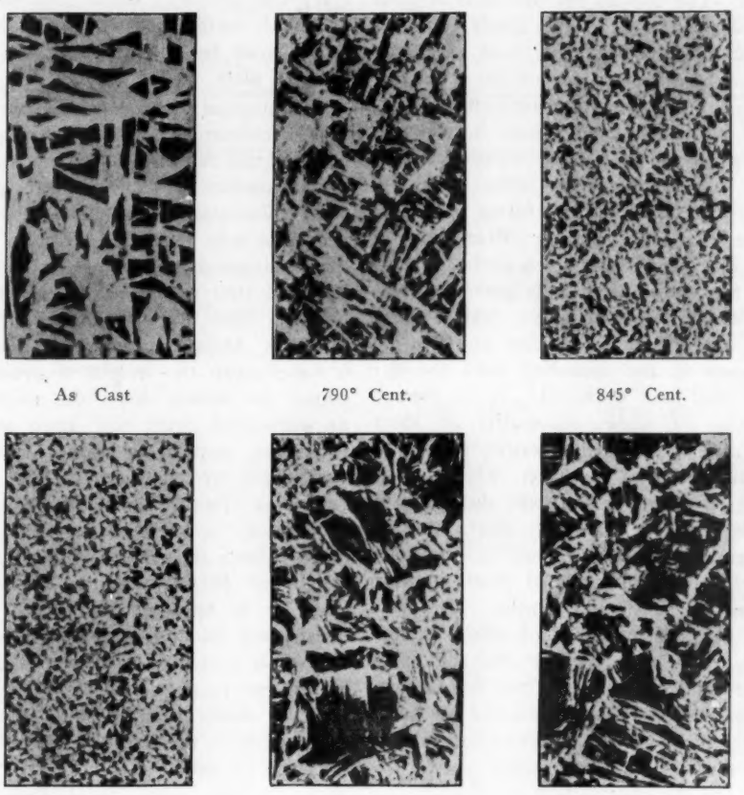


FIG. 35—SAME STEEL AS IN FIG. 34, NORMALIZED. HELD 20 MINUTES AT TEMPERATURES SHOWN, COOLED IN AIR AND THIS TREATMENT REPEATED

× 100 *E. B. Zimmer, American Steel Foundries*

The specimen at 790 degrees Cent. (1454) is partly sorbite due to the air-cooling of the dissolved pearlite, but most of the ferrite was never dissolved at all, retaining its pace at 790 degrees Cent. and again giving a weak steel at room temperature. The higher temseem to give a better chance for the peratures, up to a certain limit, seem to give a better chance for the chilling effect of air-cooling, in holding the cementite in its semi-colloidal form called sorbite.

In the specimen at 900 degrees Cent. (1652), the grains are still smaller, the ferrite is broken up and scattered in between grains of sorbite, and the weak pearlite is all gone. The latter feature takes again a higher magnification for

(*Concluded on Page* 300)

*Janitsky, *Journal*, American Society for Steel Treating, November, 1918.

Need Sheet Steel Specifications

Makers and Users of Automobile Sheets Should Co-operate in the Development of Standard Specifications—Surface Finishes, Tempers, Ability of Sheets To Form and Mechanical Drawing Capacity Are Qualities To Be Standardized

BY H. M. WILLIAMS

DEVELOPMENT of specifications for the inspection and test of automobile sheets is occupying the attention of many metallurgists and engineers. The demand for this class of steel has at least equaled the supply, creating a situation which has been a large factor in the postponement of standardization of this important automotive structural material. Great losses in unusable stampings and in labor to repair defective ones have resulted from faulty or unsuitable material, difficult forms and improper die construction. Frequently, a new die will not produce a perfect stamping for weeks after it is put into commission. Body engineers design parts that are difficult to develop and the die engineer is not consulted until the design has been approved. It is then a question of finding a quality of sheet that will produce the desired part in a certain die; a condition which often makes it necessary for some sheet mill to produce a new quality of sheet. At the present time, one sheet mill is producing over 50 different kinds of sheets varying in surface finish and temper. It is evident that this condition of affairs results in a great economic loss to both producers and consumers. Only the full cooperation of the sheet mills and the automotive body and parts makers can remedy this condition and standardize sheets, design and die construction.

How To Begin Standardization

The logical procedure as a first step in the development of specifications, is to standardize on a few sheets representing the surface finishes required for the various methods of finishing; then produce these sheets in a limited number of tempers. Temper refers to the ability of the sheet to form, such as is indicated by deep drawing, extra deep drawing, etc., and not to the carbon or alloy content of the sheet. Die construction must permit of sufficient adjustment to correct for permissible leeway in the physical properties of each temper. Whenever a new part is to be produced, the steel can be selected readily first from the standpoint of finish and then the temper selected by actual tryout of sheets. A standard nomenclature will eliminate many trade names that have been given to sheets by the manufacturers; the same name often referring to sheets of different characteristics if produced by different mills. If such a classification could be made, every one interested would soon be familiar with surface finish and temper, and sheets could be readily substituted, from plant to plant, or job to job.

The question of gage of sheets should have consideration. Instead of using gage numbers, the thickness should be specified in thousandths of an inch, with permissible tolerances within reasonable limits. The only legal gage is the United States standard gage for sheet and plate iron and steel established by act of congress in 1893. This is a weight gage, thickness being incidental. This gage is based upon the weight in avoirdupois ounces per square foot; the thicknesses as established from this gage are approximate equivalents based upon the weight for wrought iron of 480 pounds per cubic foot. Since this gage was established, wrought iron has almost entirely been superseded by steel with a weight of 489 6 pounds per cubic foot. Thus it is apparent that there is no satisfactory standard gage for sheet steel. The mills prefer to roll steel to decimal rather than to gage numbers. The thickness of sheets is important on account of its effect in the dies; before the stampings can be made, it is sometimes necessary for the sheet metal departments to separate the sheets into piles according to their thicknesses. The thickness tolerances on the sheets often are greater than can be taken care of by the dies without considerable adjustment.

Difficulties encountered in the production and utilization of sheets are numerous and varied. One of the sheet mills has a standard form or data sheet which analyzes rejections of pickled sheets. On this form, 6 defects are chargeable to sheet bars, 17 to hot rolling, 4 to pickling, 8 to cold rolling and 3 to annealing, making a grand total of 38 causes for rejection. Even after a sheet successfully passes this ordeal, it may give trouble in the stamping operation due to forming qualities, poor surface after forming, pulling coarse, stretcher strain, etc.

Forming qualities are dependent to some extent on the surface finish, and particularly on the temper, which is one of the most difficult properties to determine. Forming qualities are determined by actual tests in the dies, this being the only reliable method. Such indications as color, gloss, bending a corner of the sheet between thumb and finger, doubling entire sheet, bending test samples over on themselves both ways of the grain, tensile strength-elongation, and cupping tests are also used with varying degrees of reliability.

Closer Mill Inspection Desirable

Surface inspection is largely a matter of good judgment. It would pay every inspection department to send a man to the mills and to co-operate with the mill inspection. Many times sheets are thrown out at the mill for defects that may be discarded in cutting out the blank from which the stamping is formed. Personal contact and a knowledge of just how certain defects are produced will be enlightening to any sheet inspector.

Stretcher strains are the most undesirable defects to which all sheet is more or less subject. This defect produces the effect of lines and designs in intaglio and ofttimes is too deep to be removed by grinding. This phenomenon is intimately connected with slip of the individual grains over or past one another. The remedy consists in passing the sheet through cold rolls or a roller leveler. The stampings should be made as soon as possible after the sheets have been given this treatment; some shops are laid out to pass the sheets through a roller leveler and immediately into the forming press. One authority states that after the sheet is given the roller leveler treatment, it is in a plastic condition which may set in a few hours or over night, and unless the stamping is formed before this set takes place, stretcher strains will be produced the same as before.

Grain size is an important factor in the forming quality of the sheet. The grain size is governed to a large extent by the amount of rolling and the annealing temperature. This has been pointed out in detail in a number of published articles.

Scale is the cause of much trouble as it must be removed before finishing. Scale also is hard on the dies on account of its abrasive nature. Dies used in forming scaly material often are fitted with replaceable hardened steel inserts, which are renewed when worn.

From a paper presented at the Pittsburgh convention of the American Society for Steel Treating. The author is metallurgist, General Motors Research Corp., Dayton, O.

The scale referred to here is heavy scale and should be carefully differentiated from the extremely light thin scale, or better, oxide, that is purposely produced on high grade sheets. This type of oxide is of microscopic thickness, is not broken away in forming, and assists in preventing the sheets from rusting during transportation and storage. On parts that are finished by enameling it is important that this oxide is not heavy enough to produce a dull finish.

Seconds Cause Much Annoyance

"Seconds" are a source of much dispute. It is customary for manufacturers to include up to 15 per cent seconds in shipments of high grade auto sheets. These sheets are often a dead loss to the body or parts maker, unless some other stampings are being made which will permit their use. Often the seconds must be used where a cheaper material would have been just as satisfactory.

The sheet steel testing committee of the iron and steel division of the Society of Automotive Engineers has adopted a program for the investigation of automobile sheet steel. The object is to accumulate data which later can be incorporated into a standard specification. This program provides for the following tests dealing with the determination of forming qualities and temper: Tensile strength and elongation, Olsen cup test, Ericson cup test, Rockwell hardness test, scleroscope hardness, microscopic and macroscopic examination, chemical analysis, and bend test.

To establish a standard nomenclature for automobile sheet steels, the General Motors Corp. has adopted a tentative specification based on finish and suitability for forming certain classes of parts. This specification is drawn up with the full co-operation of the sheet mills and represents as full a knowledge as we now have. It will be noted that no attempt has been made to determine temper and forming quality, as no reliable method is as yet available. It is hoped in time, after sufficient data has been collected, that some means of developing standards for temper can be adopted. Cold rolled strip steel tempers have been standardized satisfactorily on the tensile strength-elongation test; many plants now are buying on this type of specification. The General Motors Corp. tentative specifications for automobile sheet steel are offered as a basis for discussion and criticism and are as follows:

General

1. These specifications cover automobile sheet steel.

2. These specifications are intended primarily to establish a standard nomenclature for automobile sheet steel.

3. These specifications are not intended to supplant the present method of selecting the proper temper and finish by consultation between the producer and consumer, but seek to establish a closer co-operation between producer and consumer and should be regarded as a means to a common understanding.

4. The temper and finish required will be designated by name and symbol letter; for example specification "Regular—B" covers automobile sheet steel in "Regular" temper and grade "B" finish. Temper and finish are described in detail in paragraphs 9 to 11, inclusive.

5. It is recommended that the temper of automobile sheet steel be selected to give the best forming or drawing qualities for the work in hand.

6. Any special requirements, such as oiling, degree of flatness, etc., shall be specified on the purchasing agent's order.

Process

7. Automobile sheet steel shall be made by the open-hearth or electric furnace process.

Chemical Composition

8. Automobile sheet steel shall conform approximately to the following requirements as to chemical composition:

	Per cent
Carbon	0.05 to 0.15
Manganese	0.25 to 0.50
Phosphorus, max.	0.06
Sulphur, max.	0.05

Tempers

9. Automobile sheet steel shall be furnished in the following tempers:

Regular; deep drawing; extra deep drawing.

Finish

10. The surface finish of several grades of automobile sheet steel shall conform to the requirements outlined in the accompanying table.

11. Automobile sheet steel in grades "A" to "E" inclusive shall be free from surface imperfections on one side, and shall have stamped on this surface the name of mill and heat number. Minor surface imperfections on the reverse side shall not be sufficient cause for rejection.

12. Stretcher strains, pulling coarse and other similar defects developing in the fabricating operations are extremely objectionable in grades "A" to "E" inclusive. The producer shall extend every effort to eliminate these defects.

Permissible Variations

13. The thickness shall be specified in decimals of an inch, and shall not vary from that specified on the purchasing agent's orders by more than the following amounts:

Thickness, inches	Permissible variation, variation, inches, plus or minus	Corresponding Gage No.
0.069	0.008	15
0.061	0.007	16
0.055	0.007	17
0.049	0.006	18
0.043	0.006	19
0.037	0.005	20
0.035	0.005	21
0.031	0.005	22
0.028	0.004	23
0.025	0.004	24
0.021	0.004	25

14. The width and length of automobile sheet steel shall not vary from that specified more than the following amounts:

	Under	Over
Width	0	¼ inch
Length	0	2 per cent

Packing

15. Automobile sheet steel shall be packed in such a manner as to prevent damage in transportation. Grades A to E inclusive shall be shipped with stamped side up.

Finish Requirements for Automobile Sheets

Grade	Finish	Process	Suitable for
A	Smooth silver, free from oxide.	Full acid pickle with an acid or gas pickle after the last annealing.	Two-coat enamel work.
B	Smooth glossy blue edges.	Full acid pickle (not pickled after final anneal)	Two-coat enamel work.
C	Smooth glossy blue edges.	Double pickle.	Three-coat enamel work.
D	Smooth semigloss.	Double pickle.	Painted bodies. (No sand-blasting).
E	Smooth dull.	Double pickle.	Painted bodies. (Sand blasted before painting).
F	Dull.	Commercial single pickle sheets.	Any formed sheet metal parts, which do not require the highest finish but do require freedom from scale on account of die wear, such as rocker arm covers, crank pans, dash boards, etc.
G	Dull silver.	Commercial deoxidized sheets.	Same as "F"; must be sand blasted before painting or enameling. May be substituted in emergency for grade "E" in which case it may require an extra coat of rough stuff.
H	Blue.	Unpickled open or box annealing.	Any sheet metal parts, which do not require high finish and where scale will not cause excessive die wear, such as seat bottoms, seat backs which are covered with upholstering, muffler shells, etc.

Stockholders of the Penn Seaboard Steel Corp. shortly will be called to a meeting to approve the production of two new lines of steel. The company recently obtained control of a new steel alloy which it expects to manufacture shortly for the automobile and other industries.

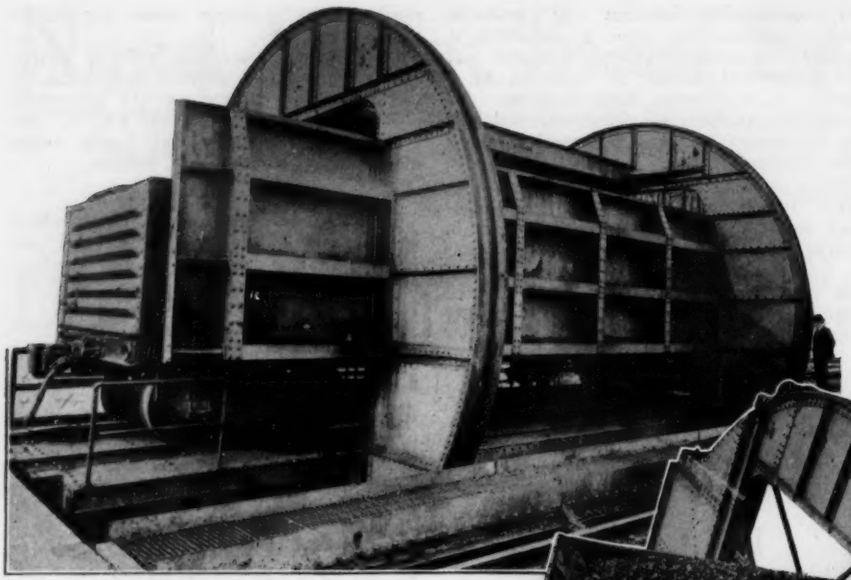


Fig. 1—Gondola car dumper in normal position after car has been placed for dumping. When the frame first begins to rotate the platen bearing the track automatically slides toward the right, permitting side of car to rest against side wall of dumper.

Fig. 2—The next step after car takes its position against the side wall, is clamping the car. The cast steel clamps, shown at the right, are motor driven and automatically grip the car as indicated.

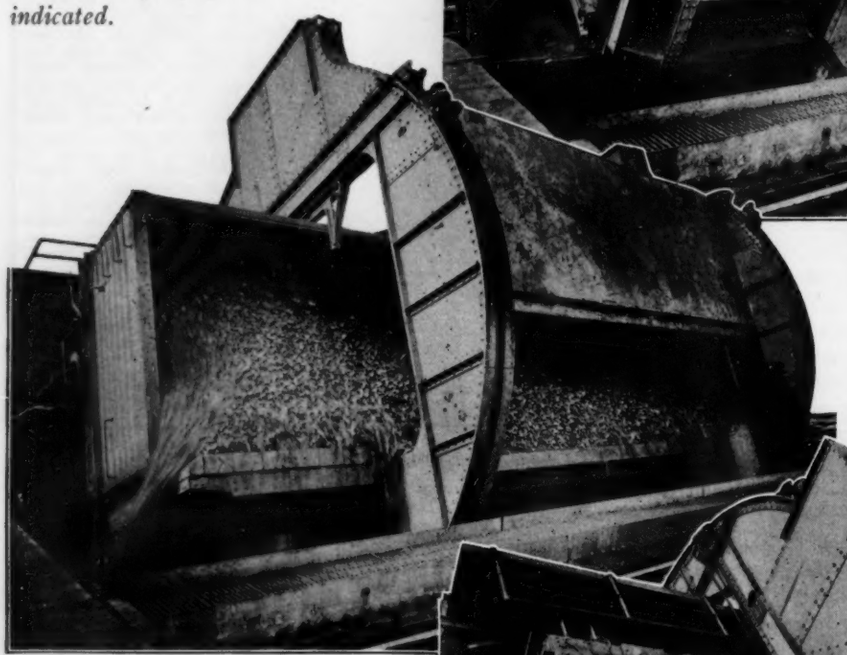


Fig. 3—Contents of the car fall against the side wall of the dumper and slide off into the pit below.

Fig. 4—After the contents of the car have been dumped, the operator reverses the controller handle, causing the dumper to return to its normal position. Just before the level position is reached, the motors automatically release the clamps and the car, thus freed, and on its movable platen, moves a few inches to the left and the tracks rest in alignment.

Limit Switches Simplify Control of Car Dumper

BY E. H. KIDDER

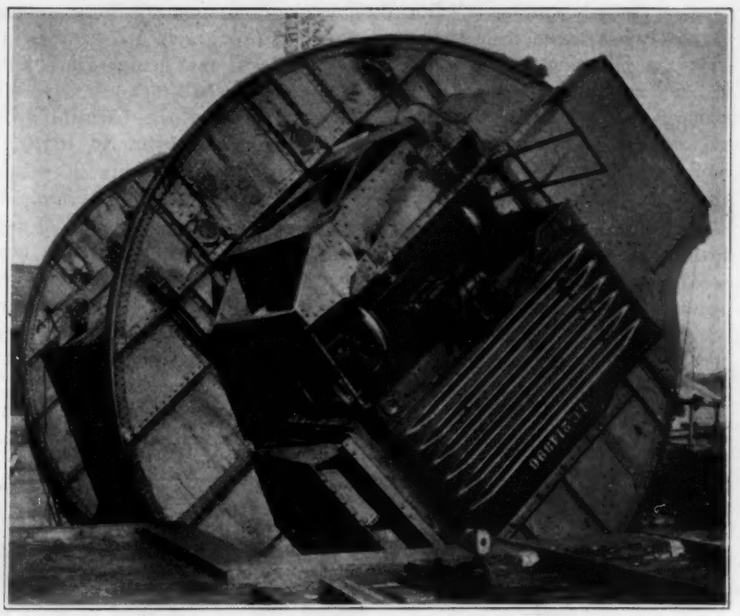


Fig. 5—End view of dumper showing hook casting which controls movement of track platen

DUMPING a 50-ton car of coal in 1 minute 10 seconds, with only one unskilled man and a 35-horsepower motor is the feat being performed daily by the gondola car dumper recently installed at the new Cahokia plant of the Union Electric Light & Power Co., St. Louis.

With only the first unit of the Cahokia plant completed at the present time the coal consumption averages but eight cars a day. Under the burden of eight cars daily the continued operation of the dumper seldom exceeds twenty minutes. The completion of additional units, of course, will place a greater burden upon the dumper, but even with this minimum load, the contractors feel the dumper pays for itself in time and labor saved. They contrast the rotary dump method with the bottom dump method, which usually requires the labor of two men for 30 minutes to unload one car of coal.

From the mechanical standpoint, the mechanism, as is the case with any rotary type of car dumper, has three distinct functions to perform—the rotation of the car through an angle which will permit the discharge of the material; support of the car on its tipping side; and the clamping of the car at the top. In spite of this multiple and seemingly complicated action, the operator, in this case, has but one controller handle to operate. This controller is of the drum type, similar in design to a street car controller. While it provides speed control its primary function is starting the rotating motor. All other operations are cared for automatically by limit switches.

The car dumper is made up of two distinctly separate structures—that of the two roller rings, each 24 feet in diameter, and the transfer table or platen upon which the car stands.

The transfer table is carried on four rollers, two in the plane of each roller ring. The track for the rollers consists of four wedge shaped or beveled castings, attached to the under side of the transfer table. The bevel of these castings is such that the transfer table, with the car, would move over to the side support if it were not restrained. It is held in place, however, by two hook-shaped castings fastened to the ends of the transfer table. One of these hooks is clearly shown in Fig. 5. Each hook casting engages a roller which is an integral part of the foundation.

How the Dumper Operates

As the dumper starts to rotate these hook-shaped castings remain in contact with the rollers, serving as a retarding device for the transfer table. That is, there is a relative movement between the transfer table and the rest of the dumper until the car has reached its side support. The angle of the beveled plates, which causes the platen to move toward the dumping side simultaneously with the rotating movement, is approximately 6 degrees and the distance of car travel from 6 to 12 inches, depending upon the width of car.

With the return movement the reverse of these operations takes place. The car remains supported by the side structure until the hook-shaped castings engage the rollers. After engagement, the continued rotation of the dumper causes a force or pressure to be exerted between the rollers and hook castings which is sufficient to push the transfer table up the slight incline made by the slope of the beveled supports and to align the rails.

With the car in the normal position on the dumper the controller handle is in the neutral position. To begin the cycle of operations, the operator moves the controller handle into the extreme forward position. Rotation of dumper and, as has been explained, the movement of the transfer table, starts immediately. Upon rotating 10 degrees, a projection on the side of one of the roller rings operates a track limit switch, which in turn, starts the 10-horsepower top clamp motor. This motor pulls the four top clamps downward simultaneously, until all have become firmly seated upon the top of the car and have exerted a predetermined pull on the operating cables. When this predetermined pull has been reached it displaces an idler, which displacement operates a load switch thereby cutting off the motor and setting a high-torque brake.

With the car firmly held to its dumping side and clamped at the top, the dumper continues to rotate until the rotating motor is automatically stopped by limit switches at the end of the rotating movement. Up to this time all the operator has done is to move his controller handle from the neutral to forward position.

He now moves his controller handle through the neutral position and into the extreme reverse position. This reverses the direction of the rotating motor and the dumper returns to its normal position. On the return movement, when the dumper is within about 10 degrees of its initial position, the top clamp motor limit switch is tripped which automatically reverses the direction of this motor and counterweights raise the top clamps

The author is engineer, Link-Belt Co., Chicago.

to their initial position. When the top clamps have reached their uppermost position the clamping motor is cut out by a limit switch operated by one of the clamps. The rotating motor is also stopped on its return movement by a limit switch and the rails are held in alignment by a solenoid brake.

Without doubt the most outstanding feature of this car dumper is its foolproof construction and its simplicity of operation. Any operator who is capable of moving the control lever in the forward position for dumping, thence into the reverse position for the return movement, is perfectly capable of handling the entire mechanism. It is impossible for the operator to perform the cycle in any other but the correct way. The supporting of the car at the dumping side and the clamping at its top are both automatic and their operation depends solely upon the rotation of the dumper.

Another feature of this dumper is the placement of the counterweights. Extreme care was used in determining the amount and correct location for the counterweights in order to minimize the power requirements. The rotating motor is of 35 horsepower, but the entire structure is so well balanced that ammeter readings, which have been taken, indicate the size of motor furnished is in excess of the actual power required.

The gondola car dumper was designed, manufactured and erected by the Link-Belt Co., Chicago.

STORAGE BATTERY TRUCK WHICH HAS FIVE MOTORS, FOUR FOR DRIVING THE WHEELS AND ONE FOR THE HOIST

Heat Treating Principles

(*Concluded from Page 295*)

final proof. The temperature, 900 degrees Cent., was high enough to cause solution of practically all ferrite in austenite within 20 minutes time. This period was not long enough for austentite grains to grow to any harmful size at that temperature. The air-cooling for half-inch cubes was fast enough to prevent the harmful growth of ferrite grains from Ar_3 to Ar_1 and similar growth of pearlite in passing through the Ar_1 range. The sample, then, is well normalized, as is the 900 degree sample in Fig. 35, in which the treatment was repeated.

Holding the steel at 955 degrees Cent. (1752) seems to have caused a larger grain structure, or at least as we see it, the areas of sorbite are larger, and there is a recurring of the old tendency for the ferrite to surround and weaken the dark sorbite parts. At 1035 degees Cent. (1895) the segregated areas of sorbite are very large, and the ferrite surrounds them almost completely in some instances. Under a higher power actual grains in the ferrite can be counted, and granulations in favorably situated patches of pearlite can be distinguished, as can grains in sorbite at the transition into granular pearlite. Roughly, the grains in the cast sample number about 1000 per square millimeter and increase in number with increasing temperature about 700 degrees Cent. (1292) to about 10,000 per square millimeter at 900 degrees Cent. (1652) with two treatments and air-cooling. Going higher above 900 degrees Cent. the grains are larger instead of smaller, increasing in size in relation to increments of temperature at about the same rate they decreased before.

The austenite grains with 0.26 per cent carbon grow large rapidly as the temperature mounts above 900 degrees Cent. Air-cooled, the large austenite grains give a tendency to large areas of sorbite, but the ferrite inherits or retains its position at the boundary of the sorbite areas, intensifying greatly the weakening effect of over-heating. Even metamorphosis at Ar_3 Ar_2 or Ar_1 is not powerful enough to eradicate the effects of the austenite mistreatment.

Treating samples twice the same, as shown in Fig. 35, produces a progressively more advanced change in those cases where equilibrium had not been attained, and very little change where growth had reached its approximate equilibrium. At 790 degrees Cent. is shown considerable more dissolving effect in Fig. 35 than in Fig. 34; at 845 more recrystallizing; at 900 degrees little change; at 955 degrees a larger grain growth in austenite (later sorbite); and at 1035 degrees only slightly larger grains.

Builds Four-Wheel Drive Lift Truck

A new elevating platform or lift truck recently has been introduced by the Terminal Engineering Co., 17 West Forty-fourth street, New York. Front and rear wheels of the truck are of large diameter, which, it is claimed, permits great freedom of action in crossing cobbled streets, railroad crossings, etc. It also is claimed that this construction allows the truck to approach unusually near to the freight car, to the floor of which the material is to be lifted or from which it is to be removed.

The truck is built with varying heights of uprights. In all cases the table, which is 4 feet long and 26 inches wide, will drop to a surface height of 5 inches from the floor. Provision has been made for changing the type of table to accommodate various kinds of material, thus eliminating loss of time in waiting for the truck to be loaded.

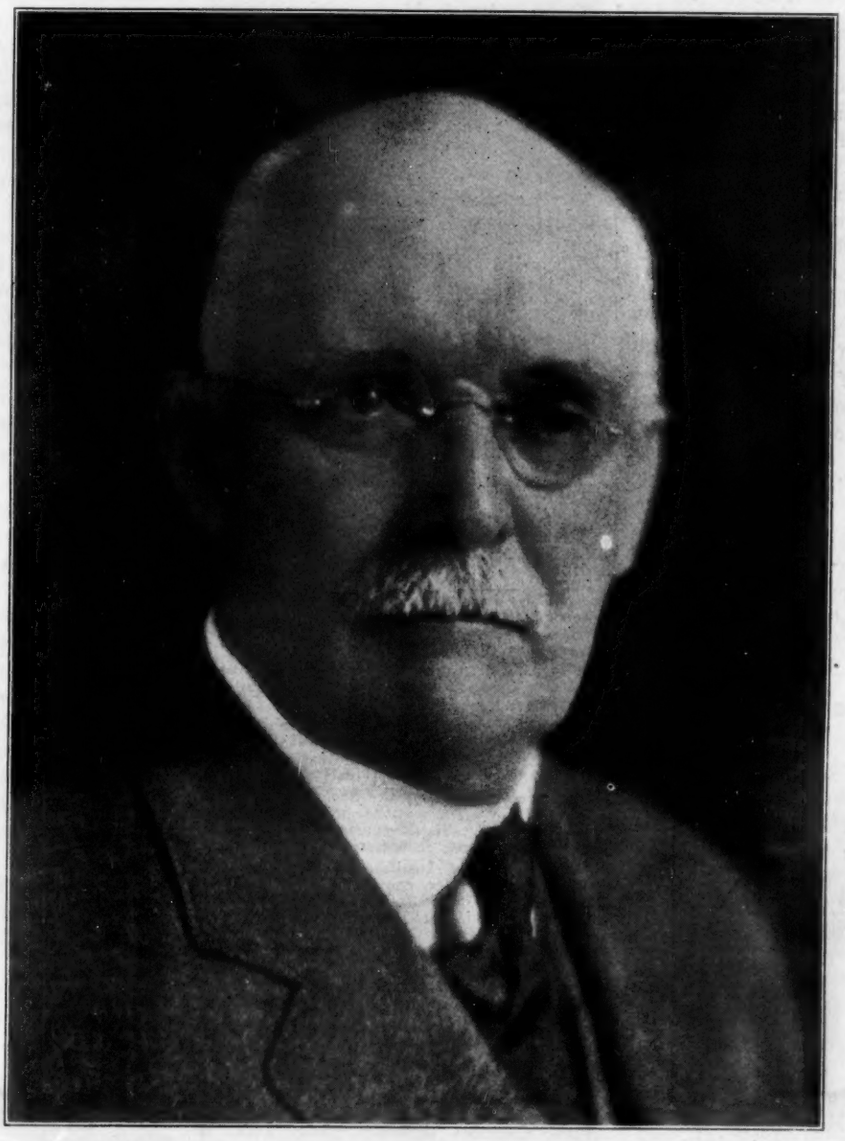
The hoist will raise a 3000-pound load at 25 feet per minute and will operate empty at 50 feet per minute. The hoisting unit is operated by an enclosed watertight motor of the same type, rating and frames as those used in driving the wheels. The reduction is through worm and gear, the worm and shaft being integral. A solenoid is used to release the brake on the motor shaft, and an automatic brake is provided to prevent the load from being lowered at an excessive rate.

All four wheels are individually driven, each being provided with a standard vehicle motor, fully enclosed in a weatherproof casing. Steering is accomplished by the rear wheels only, which are provided with internal expanding-type brakes actuated inside the reduction gear member. A coupling device is provided for use when it is desired to use the truck as a tractor. The truck is shown in the accompanying illustration.

Sixty Years Active in Tin Plate

William Banfield Retires from Follansbee Bros. Co. with Illustrious Record of Industrial Service—Helped Father Roll First Heat in United States in 1872—His Grandfather a Pioneer of Welsh Industry

WILLIAM BANFIELD, who retired as vice president and general manager of Follansbee Bros. Co., Pittsburgh, after an active connection with that company for a period of 20 years, is one of the true pioneers of the American tin plate industry. His career, spent with the tin plate mills of the United States and Wales, spans the remarkable period of 60 years. Probably few men living today have witnessed so many important changes or been so intimately identified with the amazing development of tin plate manufacture during the present generation, as Mr. Banfield. Mr. Banfield is best known as the founder of the mills of the Follansbee company at Follansbee, W. Va., and Toronto, O., both of which were built and have since been operated under his personal supervision. He came of a tin plate family. His grandfather rolled the first tin plate in South Wales and his father was also a tin plate roller. He came to this country with his father in 1872 and turned out the first heat of tin plate in this country. That was at Leechburg, Pa., where he was a heater for his father who was the first roller in that plant. Leaving Leechburg, Mr. Banfield helped start the tin plate mill at Irondale, O., where he remained for many years until that plant was taken into the Steel corporation as a unit of the American Sheet & Tin Plate Co. He then was made district manager, having for his territory all of that district now taking in Toronto, Wellsburg, Martins Ferry, Steubenville and intermediate territory. After remaining with the American Sheet & Tin Plate Co. for a few years he associated himself with the Follansbee interests, a little more than 20 years ago, and completed the mill at Follansbee in 1904. Since that time he has been general manager of the plant and three years ago constructed the new plant at Toronto, O.



During his 60 years in the steel industry Mr. Banfield met with continuous success which his friends attribute largely to his knowledge of the business and to his personality in handling men. One of the [illegible] memories of his many years in the mills is the fact that he never had any serious trouble with labor. His policy always was to meet the men half way in any difficulties that might arise or with respect to any suggestions for the improvement of conditions they had to propose. Mr. Banfield is president of the Union Savings Bank & Trust Co., Steubenville; president of the Banfield Improvement Co., Toronto; president of the Banfield Clay Co., Irondale, and is connected as an official or director of various other industrial companies, including the East Ohio Sewer Pipe Co., National Roll & Foundry Co. at Avonmore, Pa., Freeman Fire Brick Co., Dillonvale Brick Co., a sand company at Niles, O., and others. He is a trustee of Beaver college, a college at Athens, Tenn., of the Children's Bethel home, president of the Ohio Valley hospital, Steubenville, and various other organizations.

Program for Refractories Meet Announced

Many papers of interest to operators of metallurgical furnaces appear on the program of the refractories division of the American Ceramic society which will be presented at a convention of that organization to be held at the Traymore hotel, Atlantic City, N. J., Feb. 4 to 9.

The papers to be presented are the following:

"Study of the Features Which Control Spalling in Fire Clay Brick," by M. C. Booze; "Misapplication of Fire Brick Tests by Consumers," by R. M. Howe; "Disintegration of Fire Brick by Carbon Monoxide," by S. M. Phelps; "Resistance to Abrasion of Silica Lining Box for Coke Oven," by E. H. McGee and F. A. Harvey; "Furnace Improvements that Could Be Made with Better Fire Brick," by W. B. Chapman; and "The Electric Brass Furnace Refractory Situation," by H. W. Gilette.

"A Synopsis on Open-hearth Refractories,"

1. Fire clay brick for open hearths.
2. Silica brick for open hearths.
3. Basic brick for open hearths.
4. Operating conditions in the open hearth as they affect refractories.

It is believed considerable attention will be attracted by the symposium on open-hearth refractories to be held Wednesday afternoon. The discussion will be in charge of Dr. D. A. Lyon and George A. Bole, United States bureau of mines. A number of prominent open-hearth department operating officials have indicated their intention to be present to discuss the problem and all interested in the subject are being invited to participate.

Another feature of the program will be the discussion of questions relating to the production and use of refractories. These questions deal with blast furnace, open-hearth, cupola, air furnace and heating furnace brick.

General topics will be discussed at the Tuesday morning session, while burning practice will be the subject of the afternoon meeting. The problems of users of refractories are scheduled for discussion Wednesday morning.

Announce Executive Board

Representatives of national engineering organizations on the executive board of the American Engineering council for the coming year have been chosen as follows:

American Society of Mechanical Engineers: Dean M. E. Cooley, University of Michigan, Ann Arbor, Mich.; Dean A. M. Greene Jr., Princeton, Princeton, N. J.; F. K. Copeland, Chicago; L. P. Alford, Fred R. Lowe and Maj. Fred J. Miller, New York.

American Institute of Electrical Engineers: Col. J. H. Finney, Washington; Prof. Dugald C. Jackson, Massachusetts Institute of Technology, Boston; C. E. Skinner, Pittsburgh; F. B. Jewett and L. F. Morehouse, New York.

M. G. Lloyd, chief of the safety section of the United States bureau of standards, will represent the American Society of Safety Engineers; S. H. McCrory, United States bureau of public roads, the American Society of Agricultural Engineers, and H. E. Howe, Washington, the American Institute of Chemical Engineers.

Directors Are Elected

Pittsburgh, Jan. 22.—Directors recently were elected for the Industrial Cost association, Pittsburgh, of which A. A. Alles Jr., of the Schaffer Engineering & Equipment Co. is secretary. The list of the new directors follows: George W. Sheridan, assistant treasurer, West Leechburg Steel Co.; Charles S. Garrison, treasurer, the Sutton Press; James P. McLean, auditor, Pittsburgh Forge & Iron Co.; W. W. Holsinger, auditor, Lewis Foundry & Machine Co.; James E. Smith, National Tube Co.; W. F. Menk, cost accountant, Pittsburgh Water Heater Co.; Fred E. Harlan, National Tube Co.; J. F. Johnson, auditor, Oliver Iron & Steel Corp.; A. D. Lowdermilk, auditor, Standard Seamless Tube Co.; H. J. White, secretary, H. L. Dixon Co.; R. S. Porter, manager of production, McConway & Torley Co.; and C. Leslie Phebus, accountant, S. Strunz & Son.

A new 5-story plant addition for Jenkins Bros., valve manufacturer, Bridgeport, Conn., was placed in operation Jan. 1.

Convention Calendar

Jan. 22-24—Engineering Institute of Canada. Meeting at Montreal and Ottawa. Frazier F. Keith, 178 Mansfield street, Montreal, is secretary.

Jan. 22-25—Society of Automotive Engineers. Annual meeting, General Motors building, Detroit.

Jan. 23-24—American Institute of Steel Construction. Annual meeting William Penn hotel, Pittsburgh. Charles F. Abbott, 350 Madison avenue, New York, is executive director.

Jan. 31-Feb. 1—American Society for Steel Treating. Winter sectional meeting, Rochester, N. Y. W. H. Eisenman, 4600 Prospect avenue, Cleveland, is secretary.

Fig. 4-8—American Institute of Electrical Engineers. Midwinter convention at the Bellevue-Stratford hotel, Philadelphia. F. L. Hutchison, 29 West Thirty-ninth street, New York, is secretary.

Feb. 4-9—American Ceramic society. Annual meeting, Atlantic City, N. J. R. C. Purdy, Ohio State University, Columbus, O., is secretary.

Feb. 18-21—American Institute of Mining and Metallurgical Engineers. Meeting in New York. F. F. Sharpless, 29 West Thirty-ninth street, New York, is secretary.

April 24-26—American Electrochemical Society. Spring meeting at Philadelphia. Dr. Collin G. Fink, Columbia university, New York, is secretary.

Ambrose Swasey Awarded John Fritz Medal

The John Fritz gold medal, the highest honor bestowed by the engineering profession in this country, has been awarded for 1924 to Ambrose Swasey, engineer, manufacturer and philanthropist of Cleveland.

The award was made, according to the announcement, "for the building of great telescopes, the founding of the engineering foundation, and the invention and manufacture of fine machine tools, precision instruments and military and naval range finders."

The most notable of Mr. Swasey's many public benefactions was the establishment, through a gift of $500,000 of the engineering foundation as the joint research instrumentality of the four great national societies of civil, mining and metallurgical, mechanical, and electrical engineers.

The medal was established in 1902 in honor of John Fritz of Pittsburgh, pioneer in the American iron and steel industry, and is awarded annually for notable scientific or industrial achievement. Previous recipients have been Alexander Graham Bell, Gen. George W. Goethals, Guglielmo Marconi, Sir Robert Hadfield of London, and Eugene Schneider of Paris, head of the Creusot works.

Mr. Swasey was born in Exeter, N. H., Dec. 19, 1846, of New England lineage. He learned the machinist's trade in Hartford, Conn., afterward removing to Chicago. Since the early eighties he has resided in Cleveland, where with Worcester R. Warner he established the Warner & Swasey Co., of which he is now vice-chairman.

Mr. Swasey is a past president and honorary member of the American Society of Mechanical Engineers, having been one of its organizing members. He is an honorary member of the American Society of Civil Engineers and of several other engineering societies of America and Europe. He is an officer of the Legion of Honor of France and has received other honors at home and abroad.

Among the famous telescopes built under the direction of Mr. Swasey are the 36-inch Lick refractor at Mt. Hamilton, Cal., the 26-inch telescope of the naval observatory at Washington, the 40-inch telescope of the Yerkes observatory at Williams Bay, Wis., and the 72-inch reflecting telescope of the Dominion Astronomical observatory at Victoria, B. C.

The Wisconsin Iron & Wire Works, 1660 Booth street, Milwaukee, has increased its capital stock from $80,000 to $200,000.

Men of Industry

Personal News of a Business Character Pertaining to the Iron and Steel and Related Fields of Enterprise

HARRY KELLY, superintendent of the rolling mills at the Lackawanna plant of the Bethlehem Steel Co. is leaving the service of the company. He will be succeeded by George C. Barclay until recently superintendent of No. 1 rail mill. W. H. Burgard, who has been turn foreman of No. 1 rail mill, becomes superintendent. Both are Buffalo men who have received most of their steelmaking experience with the Lackawanna and Bethlehem companies.

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George E. Hardenbergh, recently made general manager of the Hofius Steel & Equipment Co., Seattle, was formerly secretary and treasurer of the Puget Sound Bridge & Dredging Co.

* * *

Thomas Simons, formerly in the St. Louis office of the United States Cast Iron Pipe & Foundry Co., on Jan. 1 became Kansas City sales agent for the company.

* * *

Clarence M. Woolley, formerly president of the American Radiator Co. has been elected chairman of that company. Charles M. Parker has been made president to succeed Mr. Woolley.

* * *

Louis I. Brown has been elected president of the Star Furnace Co., Jackson, O., to succeed Charles O. Brown, who died Nov. 8. Walter T. Brown is manager and Homer L. Davis secretary.

* * *

O. W. Mason recently retired from Hickman Williams & Co., had been with this company for a number of years and was director and eastern manager in charge of its branch office in New York and Philadelphia. Mr. Mason has been connected with the iron and steel industry since his graduation from Williams college.

* * *

C. M. Power has been appointed sales manager of the Cleveland Chain & Mfg. Co., Cleveland. Mr. Power was general sales manager of the Standard Chain Co., Pittsburgh, from 1909 to 1916, becoming sales manager of the welded chain division of the American Chain Co., Bridgeport, Conn., when the latter absorbed the Standard company. More recently he was general sales manager of the United States Chain & Forging Co., Pittsburgh.

* * *

E. F. Russell, recently placed in charge of production for the Haynes Auto Co., Kokomo, Ind., was formerly general works manager of the Locomobile Co. of

SAMUEL W. HILT

America, Bridgeport, Conn. During the war Mr. Russell had charge of automatic pistol production in the ordnance department of the army with rank of major.

* * *

C. B. McCann, recently named as personal assistant to C. F. Kettering, president of General Motors Research Corp., Dayton, O., was formerly treasurer of the Dayton Engineering Laboratories Co., also in Dayton. Mr. McCann was connected with the Dayton Engineering company from the time of its formation and has been closely associated with Mr. Kettering for many years.

* * *

Samuel W. Hilt, recently appointed district sales manager of the Midvale Co. for its Pacific coast territory, was formerly connected with the Camden Forge Co. in its New York territory, as manager of sales. Prior to that connection he was employed by Pennsylvania Export Co., Philadelphia. Mr. Hilt succeeds W. J. Patterson in his new connection with the Midvale company.

* * *

R. G. Grant, member of the American Society of Mechanical Engineers and for two years superintendent of the United States mint at Denver has had his appointment confirmed by the senate to the office of director of the mint at Washington. Frank E. Shepard, member of the American Society of Mechanical Engineers and the American Institute of Mining and Metallurgical Engineers has been appointed as Mr. Grant's successor in Denver.

* * *

Ralph W. Clark recently elected vice president of Pilling & Co., Philadelphia, New York and Boston will continue as that company's New York district pig iron sales manager, which connection he assumed in June, 1922. Previous to his association with Pilling & Co., Mr. Clark had been 22 years with the New York office of Rogers Brown & Co. He originally started to sell pig iron with Rogers Brown & Co. in the Chicago territory, later going to Buffalo, then to Boston. He spent 15 years in New York for that company. During the war he was chief of the raw materials priority division of the ordnance department at Bridgeport, Conn., and also was regional priority advisor for the government in subdistrict No. 2, with headquarters at Bridgeport. W. S. Pilling is president of Pilling & Co., and the two other vice presidents are George C. Davies and J. Ross Pilling.

* * *

Robert M. Kilgore, sales manager at New York for Jones & Laughlin Steel Co., sailed Jan. 19 for a cruise visiting the British West Indies.

* * *

H. L. Usher, New York representative of the Oliver Iron & Steel Corp., Pittsburgh, with headquarters at 50 Church street, New York, will represent in that territory the Morris & Bailey division of the Oliver corporation in the sale of cold-rolled strip steel.

* * *

Anthony Fleck has become associated as sales engineer with the A. D. Granger Co., 15 Park Row, New York, spe-

cializing in boilers of all classes, electric traveling cranes, hoists and general power plant work. Mr. Fleck formerly dealt in concrete conveying systems, and succeeds Stanley Colter, who has become associated with the Petroleum Heat & Power Co., New York.

* * *

James H. Foster, former president of Hydraulic Steel Co., Cleveland, has severed his connection with the active management of the company to attend to private interests. Mr. Foster has been operating the company for the receiver, Thomas P. Goodbody, since Oct. 26, 1923.

W. B. Jameson, recently placed in charge of the manufacturing activities of the company's plant on the East side, Cleveland, was formerly general superintendent of Earl Motors, Inc., Jackson, Mich.

* * *

L. M. Nichols has been named assistant to the general merchandising manager of the General Electric Co. and will be in the New York office. J. O. Wetherbie has been appointed field supervisor of the same department.

* * *

Herman W. Danforth, recently elected vice president and treasurer of the Missouri Rolling Mill Corp., St. Louis, is president of the Federal Land bank, St. Louis. Mr. Danforth previously has been interested in various public utility companies.

* * *

D. H. McVay, formerly assistant sales manager of the Newton Steel Co., Youngstown, O., has been appointed district manager of sales for that company in the Buffalo district with headquarters in the Genessee building.

* * *

Bruce Z. Good, recently made president of the Loomis Machine Co., Tiffin, O., was formerly secretary and treasurer of that company. He succeeds the late George D. Loomis. The company, manufacturer of well drilling machinery, was organized in 1842.

* * *

Charles M. Schwab, chairman of the Bethlehem Steel Corp., sailed for Europe Jan. 12. Mr. Schwab told ship reporters that he was cheerful in regard to business for 1924. Questioned about his comments on a nation-wide merger of automobile companies recently he replied that he had been dealing only with generalities.

* * *

H. M. Crane has been elected president of the Society of Automotive Engineers for the year 1924, and will assume his duties following the annual meeting of the society at Detroit, Jan. 22-25. Mr. Crane is technical advisor to the General Motors Co. E. A. Johnston has been elected first vice president of the society.

* * *

A. M. Thomson has been made representative in the Philadelphia district for the Hauck Mfg. Co., Brooklyn, manufacturer of oil burning appliances.

* * *

Norman Russell has been elected president of the New England Foundrymen's association succeeding George A. Ray of Taylor-Fenn Co., Hartford, Conn. Mr. Russell is president of Albert Russell & Sons Co., jobbing founder of Newburyport, Mass. This is one of the oldest jobbing foundries

NORMAN RUSSELL

in New England having been established in 1840. Mr. Russell was graduated from Dartmouth college in 1906 and has been associated with Albert Russell & Sons Co. through the 16 intervening years.

* * *

W. H. Sagstetter, formerly of Wabash, Ind., recently was made president of the Salt Lake Iron & Steel Co., Salt Lake City, which was purchased recently by the Pittsburg Boiler & Machine Co., Pittsburg, Kans. in which he has been vice president and a stockholder. Mr. Sagstetter retains his position as vice president of the Pittsburg, Kan., company.

* * *

Kenneth Hamblin has been appointed assistant to the general manager of the Rhode Island Malleable Iron Works, Hillsgrove, R. I. For the past two years Mr. Hamblin has been inspector in the research department of the American Malleable Castings association and prior to that time he was in the laboratory of Enrique A. Touceda at Albany, N. Y.

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E. P. Haquette, connected with Pratt & Whitney Co., New York, since 1917, has been appointed sales manager for the company at San Francisco with offices and salesrooms on Fremont street.

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R. E. Ludwick, recently connected with the sales staff of Whiting Corp., Harvey, Ill., manufacturer of foundry equipment, railway specialties, etc., formerly was sales manager for the Cleveland Crane & Engineering Co., Wickliffe, O. Mr. Ludwick will make his headquarters at the Chicago sales office of the Whiting Corp., 945 Monadnock Block, that city.

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LeRoy M. Sherwin recently has been made plant manager for the Central Foundry Co., Newark, N. J. Mr. Sherwin entered the foundry business as a helper at the plant of the Wellman-Seaver-Morgan Co., Akron, O., in 1905. Later he was engaged in various capacities by different companies including the General Electric Co. For the past several years Mr. Sherwin has been mechanical engineer and later assistant foundry superintendent for the Brown & Sharpe Mfg. Co., Providence, R. I.

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Lieut. Col. W. H. Green, recently elected director of Hamilton Bridge Works, Ltd., Hamilton, Ont., began his industrial career in the marine department of the London & Northwestern railway. He was on the personal staff of Lloyd George, when the latter was premier. Mr. Green was sent to Canada as representative of the war office as director of inland waterways and docks and afterward acted as special representative of the comptroller of the admiralty and the minister of shipping.

* * *

Henry M. Robinson, recently appointed chairman of the special committee of the reparations commission to investigate German holdings abroad, has been an active figure in the organization of industrial enterprises, notably in iron and steel. He had an active hand in negotiations involving the formation of the American Tin Plate Co., the National Steel Co., the American Steel Hoop Co., the American Sheet & Steel Co., which later became the American Can Co., the Republic Iron & Steel Co., and others. Having been previously interested in coal and coke making. Mr. Robinson was active in the formation of the Pittsburgh Coal Co. He at present is head of large banking interests on the Pacific Coast.

Obituaries

HARRY E. DILLER, metallurgical editor, *The Foundry*, died at his home in Lakewood, O., Jan. 17, following a brief illness. Mr. Diller was widely known through his writings on metallurgical and other technical phases of castings manufacture, was a familiar figure at sessions of the national societies and was sincerely respected for his high personal character and his scientific knowledge. Born in Lancaster, Pa., March 4, 1878, Mr. Diller attended Pennsylvania State college, but found it necessary to leave school and accept employment before completing the course. Later his college recognized his service and attainments in metallurgical fields and conferred the honorary degree of master of science on June 12, 1912.

Mr. Diller's first connection with the iron and steel industry was with the plant of the Carnegie Steel Co. at Homestead, Pa. Two years after accepting a position with this company he was placed in charge of the chemical laboratory of the Orient Steel Co., Allegheny, Pa., and later had charge of the chemical and physical laboratories of the Pennsylvania Malleable Co., McKees Rocks, Pa. After serving for about two years with the latter company, he was tendered the direction of the joint chemical laboratory of the Brooks Locomotive Works, now the American Locomotive Co., and the United States Radiator Co., Dunkirk, N. Y. A few months later he was placed in charge of the chemical laboratory of the Western Electric Co., Chicago, holding this position for eight years until he was transferred to the research laboratory of the General Electric Co., Schenectady, N. Y. Mr. Diller's work in the development of electric furnaces and his investigation of special alloy steels and malleable and gray iron practice, with the General Electric Co. secured his appointment to make a special investigating tour through England, France and Germany in 1912. On his return from this trip he was transferred to the works of the company at Erie, Pa. and was placed in charge of the physical testing laboratories where he supervised the company's gray iron and malleable foundries and gave special attention to heat treating steel castings.

Mr. Diller joined the staff of *The Foundry*, Cleveland, in 1919, serving as associate editor and later as metallurgical editor. He was active in the affairs of the American Foundrymen's association, having been elected a vice president of that organization in 1901 and later serving for a number of years on the board of directors. His services to the American Society for Testing Materials were confined largely to committee activities. He was a member of the committee on standard specifications for malleable iron, chairman of the committee on general castings and nomenclature and in many other groups dealing with matters of importance to the foundry industry. Mr. Diller was

HARRY E. DILLER

widely known as a specialist on metallurgical subjects.

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John Benjamin Wiggins, president of the John B. Wiggins Co., Chicago, manufacturer and dealer in office equipment, died Dec. 25, 1923.

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A. E. F. White, one of the incorporators of the original company formed to make the Cadillac motor car, died recently at the age of 81 years.

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James Jamieson, a pioneer foundryman of Hamilton, Ont., died Jan. 15 at the age of 83 years. For many years he was connected with Bowes-Jamieson Foundry Co., Hamilton.

* * *

Henry G. Merry, president of the Merry Land Co. of Michigan, and active in coal and iron ore mining, died in Miami, Fla., recently at the age of 61 years. He was a graduate of the University of Michigan, was a Mason and member of the Willowick Country club, Cleveland.

Form Copperas Company

The American Copperas Co. with an authorized capital of 20,000 shares no par value common stock has been organized by Youngstown steel men under the laws of Delaware to market a process of acid and copperas reclamation, developed by Henry S. Marsh, chief chemist, and Ralph Cochran, chemist, of the Sharon Steel Hoop Co.

A trial plant established at the Haselton works of the Sharon Steel Hoop Co. has been operated with success. Officers of the new company are: President, Henry S. Marsh; vice president and general manager, Robert Bentley Jr.; second vice president, Ralph Cochran; treasurer, Frank Zug and secretary, David Davis. Additional directors are: Robert Bentley, John T. Harrington and T. D. Draper.

Several Youngstown sheet plants are said to be in negotiation with the American company for installation of the new process.

Takes Alloy Sales Rights

The Calorizing Co., Pittsburgh, has acquired exclusive sales rights for the heat enduring alloy perfected by Victor Hybinette. As a result of the union, lower prices on heat enduring castings immediately were made possible. The production facilities of both organizations will be preserved. The trade name of the alloy has been changed by the Calorizing company. Mr. Hybinette will be associated in a consulting capacity with the Calorizing Co.

Sells Surplus Steel

Surplus and obsolete steel stocks are handled by the Midland Coal & Steel Co., Park building, Cleveland, which was organized several months ago. In addition the company represents a number of coal producers, steel manufacturers, rail and accessory makers. It plans to establish a warehouse shortly. Joseph A. Britton, formerly sales manager for the Fishel & Marks Co., Cleveland, which position he held for five years, is president of the company.

Buyers Delay Closing on Tools

Heavy Lists Out and New Inquiries Developing which May Be Closed in Near Future—Sales of Individual Tools Return Fairly Satisfactory Total—Ford Continues To Buy

PROSPECTIVE buyers appear a bit hesitant to place orders for equipment and machine tools which have been listed in recent inquiries. Dealers feel that the tone of the market is good, due almost entirely to the numerous lists being sent out at present. Sales are confined chiefly to single tools, a fair volume of business being realized in this manner. Several large lists, which have been out for some time, now are being figured and bids tabulated, and it is expected that this business will be closed during the last week of January. Included in the latter classification are the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., and the Standard Sanitary Mfg. Co. for their Baltimore plant.

During the week the General Electric Co. added to its list for the Philadelphia plant, while the New York Central sent out small additions to the recent inquiry. Approximately 30 attractive tools are included in a list put out by a company in greater Boston. The Main Central is inquiring for prices on four lathes and the Santa Fe on a steam hammer. The latter company is expected to bring out a good sized list shortly. The Pittsburgh board of education has an inquiry out.

Among the industrial buyers during the week are included the Ford Motor Co., General Motors Corp., the Nash Motor Co., the Edison Lamp works, Newark, N. J., the Chevrolet Motor Co., the Buick Motor Co., the Southern railroad, the Union Pacific railroad, the American Car & Foundry Co., the Chicago Bearing Metal Co., the Fruit Growers Exchange Co., the city of Los Angeles and the Bradford Corp., Chicago. Used machinery dealers report a good turnover.

Inquiry Out from Boston District for 30 Tools

NEW YORK, Jan. 22.—Machine tool buying in this immediate district is showing little improvement, although with some substantial lists pending and others contemplated for early action, sentiment continues good. The General Electric Co. within the past week has added further equipment to its Philadelphia list, the new items including six milling machines, a boring mill and a planer. The New York Central also has added a few machines to its list and at the same time is making some purchases. Recent orders placed by this railroad include a 6-foot radial drill, and a horizontal cotter and keyseat drilling machine. No action as yet has been taken by the Southern railroad relative to the issuance of its proposed list for Birmingham, although within the past few days it has brought out five or six machines; or by the Interborough Rapid Transit Co., New York, both referred to in a recent issue as under contemplation.

Included in current business are two car wheel borers for the Berwick, Pa. plant of the American Car & Foundry Co.; two car box borers for the Chicago Bearing Metal Co., Chicago; one 6-spindle arch bar driller for the Fruit Growers Express Co.; a 600-pound steam hammer for the City of Los Angeles; 100-ton bushing press for the Bradford Corp., Chicago; and a 10-foot boring and turning mill for the Pettibone Mulliken Co., Chicago, these orders being secured by an eastern builder.

Calendar and Selected News of Plant Liquidations, Wholesale Offerings, Auctions of Used and New Equipment, etc., Page 88, Classified Machinery Section.

The automotive industry in this district is showing little interest in machine tools, at this time. In fact, the Spicer Mfg. Co., Plainfield, N. J., is the only company figuring at this time, and only for two or three machines of rather special type. Prices on machine tools continue steadily with little change expected within the next month or so.

Crane buying is scattered, with inquiry light. Possibly the only exception is to be found in handpower cranes, for which there has recently been an improvement, with a fair volume of work now pending.

New England Is Hopeful

BOSTON, Jan. 22.—Inquiry for machine tools during the past week showed a marked improvement over that of the previous week. Sales of new tools have held at about the same rate since the first of the year, but nearly all Boston dealers feel confident that the last half of January will show a larger number of actual entries. The Maine Central is asking for quotations on four lathes. A greater Boston manufacturer has brought out a list covering from 20 to 30 attractive tools including lathes, planers, screw machines, an internal grinder, and turret lathes. This is one of the most attractive inquiries in many months. Other inquiry is mostly for individual tools, but is of a character which gives dealers confidence in improved buying. Prices in general are unchanged. One manufacturer of grinding machinery has issued a new price list which shows several slight reductions.

The used tool market locally is showing the effect of the large auction sale at Springfield, Mass., last week and prices have been softer as a result. No crane sales of importance are reported but some attractive inquiry is before the trade. Two electric traveling cranes, a 25-ton and a 10-ton are expected to be placed during the coming week.

Anticipate Better Business

PITTSBURGH, Jan. 22.—The closing week of January promises to be more fruitful as regards machine tool and equipment orders than were the first two weeks. Inquiries in hand are numerous and the number is being increased day by day. Most of these are for single machines although several larger ones are current including one from a manufacturer in the Johnstown, Pa. district for eight items. The Pittsburgh board of education recently put out a list of 11 lathes, 10 of one size and one of another; a shaper and various

other items of equipment for Peabody high school.

The Reliance Machinery Sales Co. here reports the disposal of 11 new lathes to one buyer this week. It also sold a new 20-inch shaper, a new 3½-foot motor-driven radial drill, and a used 64-inch boring mill, each to nearby buyers, and a large used drill press to an Alabama user. The Westinghouse Electric & Mfg. Co. still is taking quotations on its large first quarter list while the Standard Sanitary Mfg. Co. still is tabulating bids on its Baltimore plant's requirements.

One large machine tool and supply house here reports the sale of four or five woodworking machines to a Huntington, W. Va. buyer and a 6-inch motor-driven pipe machine to a nearby user. Other dealers report occasional sales of single items and more are expected this week since several telegraphic inquiries are in hand for a fair number of badly needed machines.

Crane inquiries continue to appear every few days and one or two sales are reported each week. The Jones & Laughlin Steel Corp. which will buy shears and other equipment for its new warehouse on the South Side, is about to place an order for three cranes for that building, the way for which now has been opened up.

Inquiries Are Heavy

CLEVELAND, Jan. 22.—Inquiries being brought out from time to time indicate a healthy condition of the machine tool and shop equipment market in this district, although sales, in the main, continue to be confined to one or two tools. However, the total volume of sales is satisfactory and dealers feel that with the starting of heavier production scheduled by the automobile manufacturers a decided pick up in business will be in evidence.

The Ford Motor Co. continues to be the heaviest buyer in the Detroit territory, one company reporting orders being received practically daily. These machines, many of which are being purchased from Cleveland manufacturers, will be used in increasing the production schedules, as previously announced. Other automobile companies purchasing during the week include the Buick Motor Co., the Chevrolet Motor Co. and the Nash Motor Co., the latter closing on four turret lathes from a local manufacturer. The Edison Lamp Works, Newark, N. J. purchased a large turret lathe from the same manufacturer during the week.

Other sales include four oil pumps to Cleveland manufacturers, a duplex milling machine to a northern Ohio company and one to a local firm, and a tapping machine for a local plant. A dealer here reports the receipt of an order for several machines from the Southern railroad.

In the second-hand market inquiries are much better and tools are moving in a heavier volume. A dealer reports the sale of a lathe to a Buffalo company and one to a user in Port Huron, Mich. Lathes also were sold to Chicago and Cleveland companies.

Buyers Are Holding Off

CHICAGO, Jan. 22.—Most machine tool dealers in Chicago complain that the pickup in business expected after the holiday season has not materialized. One house, however, finds business normal compared with the standard of 1912 which it believes to represent a comfortable year. Fair business is being done off floors. A manufacturer of conveying machinery in Chicago has purchased a large planer and a boring mill. One machinery house has closed for a 21-inch turret lathe. Arbor presses, small drills and small grinders are moving off floors in a fair volume.

Good business in used machinery last week is reported by a large house concentrating on this end of the machine tool selling business. The Union Pacific railroad is understood to have placed practically all of its list, aggregating $175,000 to $200.000, for its Los Angeles shops with California dealers. The Santa Fe railroad, which may have a good-sized list out shortly, is inquiring for a 1600-pound single frame steam hammer. The Marshall & Huschart Machinery Co., which is marketing the machinery of the defunct Harroum Motors plant at Wayne, Mich., is moving the standard tools rapidly.

Automobile Builders Buy

MILWAUKEE, Jan. 22.—Activity in metalworking machinery is reviving in a definite way. Although sales since Jan. 1 have not mounted into volume, there has been sufficient buying to make the situation appear in a bright light, especially as inquiry is opening up well. In the past week the state of activity was at least comparable to the average week in November and December, with the advantage of better inquiry. Automobile shops are furnishing the greater part of the current inquiry and some orders already have been placed by several divisions of General Motors Corp., and the Ford Motor Co.

Crane Awards and Inquiries of the Week

Orders Placed

One 10-ton handpower crane, 35-foot span, for the Robins Drydock Co., Brooklyn, for shipment to New Orleans, to the Whiting Corporation, Harvey, Ill.

Two 15-ton electric cranes, 60-foot span, to the Florence Pipe Foundry & Machine Co., Florence, N. J., to the Pawling & Harnischfeger Co., Milwaukee.

One 15-ton used locomotive crane for the Island Development Co., Atlantic City, N. J., to unnamed builder.

One 7½-ton electric crane, 33-foot span, placed through the Austin Co., Philadelphia, for the American Cellulose Co., Cumberland, Md., with unnamed builder.

One 10-ton electrically operated crawler crane for the Croton Sand & Gravel Co., Croton, N. Y., to the Brown Hoisting Machinery Co., Cleveland.

Four 25-ton locomotive cranes for the Missouri Pacific, to Industrial Works, Bay City, Mich.

One 10-ton crane for the Central Tube Co., Economy, Pa., to the Alliance Machine Co., Alliance, O.

One small crane for a Springfield, O., foundry to an unnamed builder.

One 10-ton, 76-foot 11½-inch span, 3-motor electric traveling crane for the Standard Seamless Tube Co., Economy, Pa., to the Milwaukee Electric Crane & Mfg. Co., Milwaukee; previously reported going to an unnamed builder.

Two 10-ton cranes, 62 and 71-foot spans respectively, for the Joseph T. Ryerson Sons Co., Chicago, to the Whiting Corp., Harvey, Ill.

Eight 6-ton jib cranes for the Pere Marquette railroad, Chicago, to the Whiting Corp., Harvey, Ill.

Miscellaneous monorail equipment for the Chicago Bearing Metal Co., Chicago, to the Whiting Corp., Harvey, Ill.

Two 10-ton cranes for the Missouri Pacific railroad, St. Louis, to the Whiting Corp., Harvey, Ill.

One 5-ton, 3-motor electric traveling crane with 80-foot span for the Anaconda Copper Mining Co., New York, to the Whiting Corp., Harvey, Ill.

One 40-ton 8-wheel steam operated standard gage locomotive crane, with 2-yard bucket, for C. F. Lytle, Sioux City, Iowa, to the Orton & Steinbrenner Co., Chicago.

Six 1-ton, 16-foot span, hand power cranes for the American Brake Shoe & Foundry Co., Chicago, to H. D. Conkey & Co., Chicago.

Two 5-ton, 27-foot span, 3-motor electric traveling cranes for the Textile Finishing Machinery Co., Boston, to the Northern Engineering Works, Detroit.

One 10-ton, 70-foot span, 3-motor traveling crane for the Josslyn Mfg. & Supply Co., Chicago, to the Northern Engineering Works, Detroit.

One 3-ton, 22-foot span, single motor crane for the W. A. Jones Foundry Co., Chicago, to H. D. Conkey & Co., Chicago.

One 10-ton handpower traveling crane for the Wood Bros. Construction Co., Lincoln, Nebr., to Whiting Corp., Harvey, Ill.

One 5-ton, 22-foot span, 2-motor electric crane for the Turner Construction Co., New York, to H. D. Conkey & Co., Chicago.

One 7½-ton, 36-foot span, 3-motor electric traveling crane for the Semi-Steel Test Foundry, Chicago, to the Northern Engineering Works, Detroit.

Two 5-ton, 40-foot span, 3-motor electric traveling cranes for the Sawbrook Steel Casting Co., Cincinnati, to the Northern Engineering Works, Detroit.

Orders Pending

Three 3-ton electric cranes, 32-foot span for the Anaconda Copper Co., 25 Broadway, New York, bids asked.

One each 7½-ton, 10-ton and 15-ton cranes with double trolleys for the new warehouse of the Jones & Laughlin Steel Corp., South Side, Pittsburgh; order about to be placed.

One floor-operated crane for the Carnegie Steel Co., Duquesne Works, Pittsburgh; order about to be placed.

Recent Industrial Business Changes

THE Columbia Steel Co., Elyria, O., manufacturer of cold-rolled strip and sheets, has made E. A. Grange, 531 Stock Exchange building, Chicago, its representative in that city and F. J. Ahern, Prospect-Fourth building, Cleveland, its agent in the latter city.

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Chain Belt Co., Milwaukee, has opened a branch sales office at 1040 Sixth avenue south, Seattle.

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The Dale Machinery Co., Inc., has established a New York office at 50 Church street, in charge of A. A. Buehring.

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Economy Bronze & Iron Works, New York, has changed its name to Economy Ornamental Iron Works.

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Morris Metal Products Co., Bridgeport, Conn., has been sold to the Ionic Holding Corp. of New York.

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D. J. Askew & Co., Dothan, Ala., general machinery repairer, has moved into its new building on East Troy street.

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Barde Steel & Machinery Co. Seattle, has increased its capital stock from $100,000 to $300,000 and changed its name to M. Barde & Sons Steel & Machinery Co.

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Sharon Steel Hoop Co. has moved its Cleveland office to 914 Union Trust building, E. Ninth street and Euclid avenue. G. A. Singer is district manager.

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The Wolverine Castings Co., Detroit, has begun moving its foundry from Kalamazoo to Plainwell, Mich., where a new plant has been constructed.

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Smith-Booth-Usher Co., San Francisco and Los Angeles, has been appointed California representative for E. W. Bliss Co., Brooklyn, N. Y.

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Chicago Malleable Castings Co., Chicago, has changed its name to the Malleable Iron Works, Inc. Chicago Steel Castings Co. has changed its name to the Chicago Malleable Castings Co. and increased its directors from three to five.

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Andrew Carrigan Co., representative on the Pacific coast for United Alloy Steel Co. and Wyckoff Drawn Steel Co., has moved its offices from 346 to 546-547 Rialto building, San Francisco.

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The Newton Steel Co., Youngstown, O., has established an office at 626 Genessee building, Main and Genessee streets, Buffalo, N. Y., with D. H. McVay in charge.

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Indiana headquarters of the Sullivan Machinery Co. of Massachusetts have been changed from Terre Haute to Michigan City, Ind. The new Indiana representative is Lowell Copeland.

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New Haven Copper Co., Seymour, Conn., manufacturer of brazers and sheathing copper, recently has changed hands. No announcement has been made of the purchasing interests.

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Bissett Steel Co., 1255 Marquette road, Cleveland, is the new name of Bissett Steel Sales Co. George Bissett heads the company which handles cold-rolled steel, welding bars, and general iron and steel finished products.

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American Sanitary Mfg. Co., Abingdon, Ill., has purchased the Northern Brass Mfg. Co., Waukegan, Ill., and will move the latter plant to Abingdon. Capital stock of the American company has been raised from $250,000 to $500,000.

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General Motors Corp. has acquired the property and assets of Armstrong Spring Co., Flint, Mich., according to Alfred P. Sloan Jr., president of General Motors Corp. The plant will be operated as the Armstrong Spring division. R. T. Armstrong has been appointed general manager.

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Frank Gebbie, Rochester, N. Y., and associates now control the Rabe Pipe & Foundry Co., Chattanooga, Tenn., following recent purchase of controlling interest. Mr. Gebbie is now president, Early Bellinger vice president, Will Cummings treasurer and Dr. W. H. Chaney, secretary.

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The American Cast Iron Pipe Co. has moved its San Francisco offices from 711 Balboa building to 808 Balboa building. W. R. Blair has been appointed San Francisco manager while J. J. Swenson continues as Pacific coast representative of the company with headquarters in Los Angeles.

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Controlling interest in the Claybourn Process Corp., Milwaukee, manufacturers of machines to do color-printing by a new process has been acquired by Herman W. Falk and associates in the Falk Corp., that city, manufacturer of steel castings, herringbone gears and pinions, oil engines, etc. L. W. Claybourn remains in general charge of the business.

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Interest in the Ground Coal Engineering Corp., Chicago, has been purchased by Milton W. Arrowood from Sanford Riley Stoker Co. Effective Dec. 29, the name of the Ground Coal company was changed to Universal Engineers, Inc. It will handle engineering work in pulverized fuel, conveying and handling materials, etc. Pending establishment of offices in New York and Chicago, company may be reached under its new name at 2 Downing street, Worcester, Mass.

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Donald Woodward recently acquired stock control of Rhodolite Co., Le Roy, N. Y., producer of garnet and corundum, from Palmer, Hayes & Co., 149 Broadway, N. Y., who sponsored and financed the company and became owner of 90 per cent of its stock last year. The Rhodolite abrasive properties and mills are located near Willets, N. C. The former office of the company, 149 Broadway, New York, has been discontinued and a new office opened at 59 North street, Le Roy, N. Y. The new officers of the company are: Donald Woodward, president; Robert S. Perry, vice president, and J. L. Heimlich, secretary and treasurer.

Construction and Enterprise

Concise and Timely Business Building Opportunities from the Field of Industry

SAN FRANCISCO—Automotive Street Cleaning Machine Corp. has been incorporated for $250,000 by George A. Connolly, C. M. Tracy, A. J. Harzfeld, R. Spine and Jerome Politzer, with the last named, at Mills building, as attorney.

BRISTOL, CONN.—Crane Mfg. Co. has taken over Pequabuck Bottling Works and will remodel plant for manufacture of patented bolt.

WINSTED, CONN.—The Universal Bronze Bearing Co. was badly damaged by fire Jan. 11 with loss of about $40,000 to plant and equipment. David Goldich, John O'Brien and E. B. Gaylord are owners.

LAKELAND, FLA.—The Mine & Mill Supply Co. will construct 2-story, $25,000 warehouse on Mulberry street.

CHICAGO—Miller, Cohen & Co., Inc., has been incorporated for $100,000 to deal in waste materials, at 1416 Blue Island avenue, by Jacob Miller, Max Cohen and Harry Chapman.

CHICAGO—Detroit Copper & Brass Rolling Mills, Robert H. Adams, 111 North Jefferson street, agent, plans $100,000 1 and 2-story, 50 x 190-foot warehouse and office.

CHICAGO—Simonds Saw & Steel Co. purchased mill constructed building at 127-9 South Green street, which it will occupy for office and stock purposes.

CHICAGO—Crown Die & Tool Co., James W. Barrett, 555 West Monroe street, president, has let contracts for $30,000 1-story, 70 x 125-foot machine shop.

CHICAGO—The Maine Car Co., 208 South La Salle street, has been incorporated for $5000 to manufacture and deal in cars, trucks, etc., by M. McGarry, M. McKerchar and K. Storm.

CHICAGO—The E. A. Wilcox Mfg. Co., 6330 Stony Island avenue, has been incorporated for $30,000 to manufacture products from wood, iron, copper, brass, etc., by E. J. Zoll, H. P. Anthony and R. B. Anthony.

CHICAGO—Economy Clamp & Machine Co., 3430 South Ashland avenue, has increased its capital stock from $100,000 to $150,000. The company recently completed a plant and is buying screw machines and a turret lathe.

CHICAGO—Federal Truck Co. of Chicago, 2931 South Wabash avenue, has been incorporated for $100,000 to manufacture and deal in automobiles and motor trucks and accessories, by Grant C. Nichol, M. L. Pulcher, E. P. Hammond, etc.

CHICAGO—Complete Calculating Co., 332 South Michigan avenue, has been incorporated for $100,000 to manufacture and deal in calculating, accounting and booking devices, cash registers, etc., by Hyman E. Goldberg, George E. Scott and Robert P. Lamont.

CHICAGO—Martin J. O'Brien Co., Inc., 4646 West Washington boulevard, has been incorporated for $2000 to manufacture and deal in automobiles, motors, electrical devices, etc., by Martin J. O'Brien, Laurence J. O'Brien and Joseph E. White.

ELMHURST, ILL—Elmhurst Steel & Stamping Co., Inc., has been incorporated for $100,000 to manufacture and deal in steel and strip metal of all kinds, by Harlow P. Steinbrenner, Joseph L. Stewart and Henry S. Steinbrenner.

Where additional information is presented, reference is made to date of issue in which previous item appeared.

BOSTON—The Universal Safety Razor Co. of Boston, has been incorporated for $75,000 by Raymond L. Head and William G. Burns, Allston, Mass., and William H. Quinn, Cambridge, Mass.

BATTLE CREEK, MICH.—United Metal Products Co., 27 Fonda avenue, has been incorporated for $1,000,000 to manufacture, acquire and deal in racks, shelves, trays, baskets and other metal products, by George J. Genebach, William D. Baker and Edward D. Strain.

DETROIT—Wales Stoker Co. has been incorporated for $1000 to manufacture and sell automatic stokers, by A. J. Aldrich, B. F. Green and E. R. Bissell, of Hillsdale.

DETROIT—Joseph T. Ryerson & Son Co., Inc., let contract to W. E. Wood Co. for a 1-story addition at Euclid, between Hartwick and Grand Trunk railway, to cost $81,000.

DETROIT—Standard Service Tool Co. has been incorporated for $100,000 to deal in machine tools for garages, by Cameron B. Waterman, 682 East Fort street, Ira D. Waterman and James B. Giern.

JACKSON, MICH.—Jackson Reinforced Concrete Pipe Co. has been incorporated for $30,000 to manufacture reinforced sewer pipe by David D. Tracy, 407 Quarry street, Michael F. Murray and Harold C. Farnham.

KALAMAZOO, MICH.—McIntyre Motor Co. has been incorporated for $15,000 to operate a general machine shop, by J. H. Waite, 214 East Lovell street, T. J. Bestervelt and S. F. Maple.

ST. LOUIS—Central Pattern Co., 216 Morgan street, has been incorporated for $20,000 to make, manufacture and deal in wood and metal patterns, molds, castings, models and match plates and do a general pattern business, model maker, metallurgist and deal in hardware and tools, by John H. Wedde, Louise M. Wedde, Fred W. Wack Jr., and Helen Wack.

NEWARK, N. J.—Foundry of Crocker-Wheeler Co., foot of Rome street, was sold recently to unnamed buyer. All equipment was included in sale. No extensions are expected to be made in the immediate future.

BROOKLYN, N. Y.—Saltzer & Weinsier has been incorporated for $500,000 to manufacture and deal in plumbing supplies, by M. J. Saltzer, M. Weinsier and E. Wensinger, with H. D. Levy, 105 Court street, as attorney.

BROOKLYN, N. Y.—Universal Rotary Pump Corp. has been incorporated to build refrigerating machinery, with $20,000 capital, by C. W. Zobel, S. H. Roberts and E. J. McCormick, with Lewis & McNamara, 322 Ninth street, as attorney.

COLONIE, ALBANY CO., N. Y.—G. R. S. Products has been incorporated for $10,000 to manufacture washing machines, by W. H. Shaffer, E. E. Pink and T. W. Macon.

MANCHESTER, ONTARIO CO., N. Y.—Pioneer Thresher Co. has been incorporated for $100,000 to manufacture threshing machinery, by S. Bates, G. W. Jones and C. W. Stone.

NEW YORK—Meco Products Corp. has been incorporated for $20,000 to manufacture automatic machines, by H. A. Smith, M. J. Maguth and R. R. Mulligan, with F. J. Knorr, Albany, N. Y., as attorney.

NEW YORK—Kleen Heet Atlantic Distributing Co. has been incorporated to manufacture oil burners, with 200 shares no par value common stock, by E. M. Schroeder, V. P. Bradley, with J. S. Chapman Jr., 68 William street, as attorney.

ROCHESTER, N. Y.—Metal Stamping Corp. has been incorporated for $35,000 by D. M. Parker and L. E. Carr, with A. F. Montague, Syracuse, N. Y., as attorney.

CARTHAGE, O.—Lunkenheimer Co., Cincinnati, is taking bids through its architect for 1-story, 308 x 410-foot machine shop.

CINCINNATI—The Viking Sprinkler Co. has been incorporated for $10,000 to manufacture sprinklers, by Edward A. Gelhaus, William Traxel, Simson H. Hurtig, George A. Tischbein and Edward C. Tischbein.

DAYTON, O.—Duro Pump Mfg. Co., Charles E. Burnett, 45 East Monument street, president, has closed bids on constructing $150,000, 4-story, 65 x 155-foot factory addition. About $30,000 will be spent for equipment. *Noted Dec. 27.*

FINDLAY, O.—Star Equipment Co., manufacturer of steel parts for coal and ash handling devices, is expected to start operations as soon as equipment is installed.

GALION, O.—Galion Iron & Mfg. Co., D. C. Boyd, president, plans $50,000, 1-story, 50 x 160-foot brick foundry building. Althous & Jones, Market building, Mansfield, O., is architect.

TOLEDO, O.—Warnke Bros., E. H. Warnke, 27 Erie street, president, contemplates constructing 1-story, $25,000 sheet metal shop.

ERIE, PA.—The Erie Patent Block Co. has been incorporated at $50,000 capital to manufacture concrete products, by E. M. Lowe, L. M. Lowe and W. G. Lowe, all of Warren, Pa.

PITTSBURGH—A charter has been granted the Mehun Mfg. Co., Inc., to manufacture, buy and sell dies, tools, machinery, etc. Incorporators are David Rose and John H. Poague, of Pittsburgh, and Morris Goodman, of Swissvale, Pa.

SHARON, PA.—Additions to the transformer plant here of the Westinghouse Electric & Mfg. Co. are planned for this year to double its output.

NORFOLK, VA.—W. P. Randall, engineer for Southern Wheel Foundry, plans $100,000 addition of brick and concrete, for that company, to be built on the west side of Lansing avenue on the Belt Line railroad.

HIGHLAUN, ST. ALBANS, W. VA.—Virginian Tire & Rubber Co. was damaged by

fire recently with $50,000 loss to plant and equipment. Plans for rebuilding are being formulated.

Business in Canada

STAVE FALLS, B. C.—B. C. Electric Railway Co. proposes to build additional unit of 24,000 horsepower to hydroelectric plant here at a cost of about $1,500,000.

VANCOUVER, B. C.—J. W. Mackintosh has taken out a permit to erect machine shop on Kingsway avenue here and will shortly be in the market for equipment for same.

ACTON, ONT.—Acton Machine Co. plans addition to foundry to cost $20,000.

BOWMANVILLE, ONT.—Bowmanville Foundry Co., Ltd., has been incorporated to acquire plant and business of Bowmanville Foundry Co., and to carry on foundry and manufacturing business to produce metal products, castings, etc., with $100,000 capital, by Samuel King, Oscar H. King, James Stewart and others, all of Toronto, Ont.

BRANTFORD, ONT.—Metal Founders, Ltd., has been incorporated for $40,000 by Alfred Sergeant, William H. Hamilton and Archibald M. Harley.

BRIDGEBURG, ONT.—Horton Steel Co. was damaged by fire Dec. 24 with loss to the main plant. A larger plant of steel construction will replace the damaged unit.

DIXIE, ONT.—R. T. Donaldson will purchase special machinery and tools for manufacture of automobile radiator shutters, etc.

DUNDAS, ONT.—Kaustine Mfg. Co., Ltd., has been incorporated to manufacture sewage disposal equipment, tanks, containers, etc., with $55,000; by John F. Crowley, Harry F. Powell, Morley A. Krompart and others. The company will start work immediately on addition to its plant here, and will install equipment for increasing its present capacity. *Noted Nov. 29 as Kaustine Co., Ltd.*

DUNNVILLE, ONT.—Lundy Products Co., manufacturer of ornamental iron fencing, woodenware, etc., has awarded general contract to Jean Bennett for erecting plant to cost $30,000.

HAMILTON, ONT.—J. P. Porter Co. will start work soon on plant here to cost $150,000 for manufacture of patent fuel from anthracite screenings.

HAMILTON, ONT.—Canadian Westinghouse Co. has awarded the steel contract to the Hamilton Bridge Co. for foundry to be erected on Aberdeen avenue west. Bids for other work will be received by B. H. Prack, Main street east, Hamilton.

HAMILTON, ONT.—Electro Tin Products, Ltd., has been incorporated to erect and operate furnaces, machinery, plant, for the production of metals, tin, metal products, etc., with $1,000,000 capital, by Albert H. Boddy, William J. MacKellar and Anthony V. Sedgewick.

NIAGARA FALLS, ONT.—Fagen & Co., Northcott building, Queen street, is asking for machinery for manufacture of wire, etc.

ORILLA, ONT.—Tools & Hardware, Ltd., has been incorporated for $100,000 to manufacture and deal in tools and novelties of metal and wood, by Frank Tissington, Joseph E. Harvey and William H. Tudhope.

OTTAWA, ONT.—Batineau Power Co., J. B. White, vice president, plans building hydroelectric power plant on the Gatineau river at Chelsea.

PORT COLBORNE, ONT.—Marine Welding & Boiler Co. has started building operations on a machine shop here to cost $10,000. *Noted Dec. 6.*

TORONTO, ONT.—Premier Cutlery Co. of Canada, Ltd., has been incorporated for $550,000 by Andrew A. Shuyler, Franklin W. Fisher and Gertrude Collard.

TORONTO, ONT.—Consolidated West Dome Mines is in the market for mining machinery and equipment. C. H. Manton, 420 Bank of Hamilton building, is purchasing agent.

Warehouse Steel Prices

Quotations in Cents Per Pound at Leading Market Centers

STEEL BARS

Boston	3.515c
Buffalo	3.55c
Chicago	3.20c
Cincinnati	3.40c to 3.50c
Cleveland	3.36c
Detroit	3.35c
Los Angeles	4.25c
New York	3.54c
Philadelphia	3.47c
Pittsburgh	3.15c
San Francisco	3.75c
Seattle	3.75c
St. Louis	3.35c
St. Paul	3.45c

IRON BARS

Boston	3.515c
Buffalo	3.50c
Chicago	3.20c
Cincinnati	3.40c to 3.50c
Detroit	3.35c
New York	3.54c
Philadelphia	3.47c
St. Louis	3.35c

SHAPES, STRUCTURAL

Boston	3.615c
Buffalo	3.65c
Chicago	3.30c
Cincinnati	3.50c to 3.60c
Cleveland	3.46c
Detroit	3.45c
Los Angeles	4.10c
New York	3.64c
Philadelphia	3.57c
Pittsburgh	3.25c
San Francisco	3.60c
Seattle (large shapes)	3.75c
St. Louis	3.45c
St. Paul	3.55c

PLATES

Boston	3.615c
Boston, 3/16-inch	3.04c
Buffalo	3.65c
Chicago	3.30c
Cincinnati	3.50c to 3.60c
Cleveland	3.46c
Detroit	3.45c
Detroit, 3/16-inch	3.45c
Los Angeles	4.00c
New York	3.64c
Philadelphia	3.57c
Philadelphia, 3/16-inch	3.82c
Pittsburgh	3.25c
San Francisco	3.75c
Seattle	3.75c
St. Louis	3.45c
St. Paul	3.55c

NO. 10 BLUE ANNEALED SHEETS

Boston, 3/16-inch	4.515c
Buffalo	4.30c
Chicago	4.00c
Cincinnati	4.10c
Cleveland	3.60c to 4.06c
Detroit	4.15c
Los Angeles	5.00c
New York	4.34c
Philadelphia	4.10c
San Francisco	5.00c
Seattle	5.00c
St. Louis	4.10c
St. Paul	4.25c

NO. 28 BLACK SHEETS

Boston	5.00c
Buffalo	5.00c
Chicago	4.70c
Cincinnati	4.90c
Cleveland	4.50c to 4.65c
Detroit	4.85c
Los Angeles	6.20c
New York	4.50c to 4.70c
Philadelphia	5.15c
San Francisco	5.80c
Seattle	6.00c
St. Louis	4.75c
St. Paul	4.95c

NO. 28 GALVANIZED SHEETS

Boston	6.00c
Buffalo	6.10c
Chicago	5.85c
Cincinnati	5.90c
Cleveland	5.60c to 5.80c
Detroit	6.00c
Los Angeles	7.00c
New York	5.50c to 5.70c
Philadelphia	6.25c
San Francisco	6.50c
Seattle	7.00c
St. Louis	5.75c
St. Paul	5.75c to 6.00c

BANDS

Boston	4.315c
Buffalo	4.35c
Chicago	3.95c
Cincinnati	4.00c to 4.10c
Cleveland	4.01c to 4.16c
Detroit	4.10c
Los Angeles	4.90c
New York	4.39c
Philadelphia	4.27c
Pittsburgh	3.95c
San Francisco	4.50c
Seattle	4.75c
St. Paul	4.20c

HOOPS

Boston	5.80c
Buffalo	4.65c
Chicago	4.55c
Cleveland	4.01c to 4.16c
Detroit	4.95c
New York	5.19c
Philadelphia, 1 inch and wider	
20 gage and heavier	4.27c
Pittsburgh	3.95c
Seattle	5.50c
St. Paul	4.80c

COLD ROLLED STEEL

Boston (rounds)	4.35c
Boston (shapes)	4.85c
Buffalo (rounds)	4.45c
Buffalo (shapes)	4.95c
Chicago (rounds)	4.00c
Chicago (shapes)	4.50c
Cincinnati (rounds)	4.25c
Cincinnati (shapes)	4.75c
Cleveland (rounds)	4.10c
Cleveland (shapes)	4.60c
Detroit (rounds)	4.30c
Detroit (shapes)	4.80c
Los Angeles (rounds)	5.60c
New York (rounds	4.40c
New York (shapes)	4.90c
Philadelphia (rounds)	4.35c
Philadelphia (shapes)	4.85c
Pittsburgh (rounds)	4.05c
Pittsburgh (sq. hex. and flats)	4.55c
San Francisco (rounds)	5.50c
Seattle (rounds)	5.50c
St. Paul (rounds)	4.25c

WELDED PIPE

Discounts from warehouse, New York City

Standard Steel Pipe

	Black	galvanized
¼-⅜-inch butt	—31	+ 2
½-inch butt	—41	—24
¾-inch butt	—46	—32
1/3-inch butt	—48	—34
3½-6-inch lap	—44	—30
7-8-inch lap	—41	—11
9-10-inch lap	—35	— 8
11-12-inch lap	—34	— 6

Wrought Iron Pipe

	Black	galvanized
¼-⅜-inch butt	+44	+78
½-inch butt	— 4	+19
¾-inch butt	—11	+ 9
1-1½-inch butt	—14	+ 6
2-inch lap	— 5	+14
3-6-inch lap	—11	+ 6
7-12-inch lap	— 3	+16

Bourne-Fuller Service

includes immediate shipment of all Iron and Steel materials from Cleveland and Cincinnati

Warehouses

If you are not receiving our Stock-list we shall be glad to send it to you regularly upon request.

Upson Works

Open Hearth Steel Bars for special uses. Also a complete line of Bolts and Nuts. Prompt Shipments.

THE
BOURNE-FULLER CO.
Iron, Steel
Pig Iron
Coke

CLEVELAND

New York **Chicago**
San Francisco
Cincinnati **Detroit**

Iron and Steel Prices

Iron Ore

LAKE SUPERIOR ORES
Per Gross Ton Lower Lake Ports

Old range bessemer, 55 per cent iron.$6.45
Mesabi bessemer, 55 per cent iron.... 6.20
Old Range nonbessemer, 51½ per cent iron 5.70
Mesabi nonbessemer, 51½ per cent iron 5.55

EASTERN LOCAL ORES
Cents per unit delivered at Eastern Pennsylvania and New Jersey furnaces

Foundry and basic, 53 to 63 per cent ..... 10.00 to 11.00
Copper free low phosphorus 53 to 65 per cent..... 13.25 to 16.50

FOREIGN IRON ORE
Cents per unit, c.i.f. Atlantic ports

Spanish low phosphorus, 52 to 54 per cent ..... 9.00 to 10.00
Algerian low phosphorus, 52 to 54 per cent..... 10.00 to 10.50
Swedish and Norwegian low phosphorus, 68 per cent.... 11.00 to 12.00
Swedish foundry or basic, 66 to 68 per cent ..... 9.25 to 10.00
Spanish foundry or basic, 50 to 54 per cent..... 9.00

Manganese Ore

Prices do not include duty at rate 1 per cent per pound of metallic manganese contained.

Brazilian, minimum 47 per cent.....
.....40 to 42 cents c.i.f. tidewater
Indian, minimum 47 per cent.....
.....40 to 42 cents c.i.f. tidewater
Caucasian, 53 to 55 per cent.....
.....43 cents c.i.f. tidewater

Fluor Spar

85 and 5 per cent grade

Washed gravel, Kentucky and Illinois mines, per net ton.$19.75 to 23.50
Washed gravel, imported, duty paid eastern tidewater, per gross ton ..... 20.60 to 21.10

Rivets

Structural rivets, Pittsburgh.. 2.90c
Rivets, 7/16-in. and smaller.....
.....65, 10 and 5 off

Nuts and Bolts

(Up to 1¼ and 1⅓ inches inclusive)

Hot pressed square or hexagon blank .....$4.50 off list
Hot pressed square or hexagon tapped .....$4.50 off list
Cold punched square or hexagon blank .....$4.00 off list
Cold punched, square or hexagon.... .....$4.00 off list
Cold punched semifinished hexagon nuts ⅝-inch and larger.....75 and 5 off
Cold punched semifinished hexagon nuts 9/16-inch and smaller.....80 and 5 off
Price f.o.b. Pittsburgh, packages of 50.

CARRIAGE BOLTS
(¾ x 6 inches, smaller and shorter)

Rolled thread .....60 and 10 off
Cut thread .....60 off
Larger and longer.....60 off

MACHINE BOLTS
(¾ x 4 inches, hot pressed nuts)

Rolled thread.....60, 10 and 10 off
Cut thread .....60 and 10 off
Larger and longer .....60 and 10 off
((¾ x 4 inches, cold punched nuts)
Cut thread .....50, 10 off
Larger and longer .....50, 10 off
Lag screws .....65 and 10 off
Plow bolts Nos. 1, 2 and 3 heads.... .....50 and 10 off
4 to 10 heads .....50-10 + 20 off
Flat and round head stove bolts..... .....75, 10 and 5 off
Other stove bolts .....75 and 5 off
Tap bolts .....25 and 10 off
Bolt ends with hot pressed nuts..... .....60 and 10 off
Bolt ends with cold punched nuts.... .....50 and 10 off
Blank bolts .....60 and 10 off
Rough stud bolts with nuts..... .....50 off

Washers

Wrought washers .....$5.00 to $5.50 off

Steel Pipe

(Effective April 19, 1923)
Pittsburgh basing discounts, jobbers' carloads.

	Black	Galvanized
Butt Weld		
⅛-inch	45	19½
¼ and ⅜-inch	51	25½
½-inch	56	42½
¾-inch	60	48½
1 to 3-inch	62	50½
Lap Weld		
2-inch	55	43½
2½ to 6-inch	59	47½
7 to 8-inch	56	43½
9 and 10-inch	54	41½
11 and 12-inch	53	40½
REAMED AND DRIFTED		
Butt Weld		
1 to 3-inch	60	48½
Lap Weld		
2-inch	53	41½
2½ to 6-inch	57	45½
EXTRA STRONG—PLAIN ENDS		
Butt Weld		
⅛-inch	41	24½
¼ and ⅜-inch	47	30½
½-inch	53	42½
¾-inch	58	47½
1 to 1½-inch	60	49½
2 to 3-inch	61	50½
Lap Weld		
2-inch	53	42½
2½ to 4-inch	57	46½
4½ to 6-inch	56	45½
7 to 8-inch	52	39½
9 and 10-inch	45	32½
11 and 12-inch	44	31½
DOUBLE EXTRA STRONG		
Butt Weld		
½-inch	42	32½
¾ to 1½-inch	45	35½
2 to 2½-inch	47	37½
Lap Weld		
2-inch	41	32½
2½ to 4-inch	43	34½
4½ to 6-inch	42	33½
7 to 8-inch	38	25½

Wrought Iron Pipe

(Effective Jan. 23, 1923)
Pittsburgh basing discounts, jobbers, carloads

THREADS AND COUPLINGS		
Butt Weld		
¼ and ⅜-inch	+11	+29
½-inch	22	2
¾-inch	28	11
1 to 1½-inch	30	13
Lap Weld		
1¼ and 1½-inch	Upon application	
2-inch	23	7
2½ to 6-inch	26	11
3 to 6-inch	28	13
7 to 12-inch	26	11
PLUGGED AND REAMED		
Two points less than above		
EXTRA STRONG, PLAIN ENDS		
Butt Weld		
¼ and ⅜-inch	+19	+54
½-inch	21	7
¾-inch	28	12
1 to 1½-inch	30	14
Lap Weld		
2-inch	23	9
2½ to 4-inch	29	15
4½ to 6-inch	28	14
7 to 8-inch	21	7
9 to 12-inch	16	2
DOUBLE EXTRA STRONG		
Butt Weld		
½-inch	+47½	+59½
¾-inch	+28	+40
1-inch	+34	+46
1¼-inch	+28	+40
1½-inch	+27	+39
Lap Weld		
2 and 2½-inch	+13	+25
3 to 4-inch	+ 8	+17
4½ to 6-inch	+ 9	+18
8-inch	+12	

Boiler Tubes

L. C. L. discounts. C. L. 4 points larger

STEEL (Lap welded)
(Effective April 19, 1923)

2 and 2¼-inch ..... 23 off
2½ and 2¾-inch ..... 33 off
3-inch ..... 36 off
3¼ to 3¾-inch .....38½ off
4 to 13-inch ..... 42 off

CHARCOAL IRON
(Effective April 12, 1923)

1½-inch .....+22
1¾-inch .....+12
2 and 2¼-inch .....+ 2
2½ to 3-inch 3
3¼ to 4½-inch 5

SEAMLESS COLD DRAWN
(Effective April 19, 1923)

1-inch ..... 51 off
1¼ and 1½-inch ..... 43 off
1¾-inch ..... 27 off
2 and 2¼-inch ..... 18 off
2½ and 2¾-inch ..... 28 off
3 and 3¼-inch ..... 32 off
3½ and 3¾-inch ... . 33 off
4-inch ..... 37 off
4½ and 5-inch ..... 29 off

SEAMLESS HOT ROLLED

3 and 3¼-inch ..... 34 off
3½ and 3¾-inch ..... 35 off
4-inch ..... 39 off

SEAMLESS STEEL MERCHANT BOILER TUBES

Extras:

Add $8 per net ton for more than four gages heavier than standard and add 10 per cent to theoretical weight.

Add 5 per cent for lengths over 24 feet and not over 26 feet.

Smaller tubes than 1-inch and lighter than standard gage to be sold at mechanical tubing list and discount.

Intermediate sizes and gages not listed above take price of next larger outside diameter and heavier gage.

SEAMLESS STEEL MECHANICAL TUBING

Base Discounts

Carbon, 0.10 to 0.20 per cent..... 83 off
Carbon, 0.30 to 0.40 per cent..... 81 off
Carbon, 0.40 to 0.50 per cent....net price
Plus differentials and extras for cutting.

SEAMLESS STEEL LOCOMOTIVE AND SUPERHEATER TUBES
(Effective April 19, 1923)

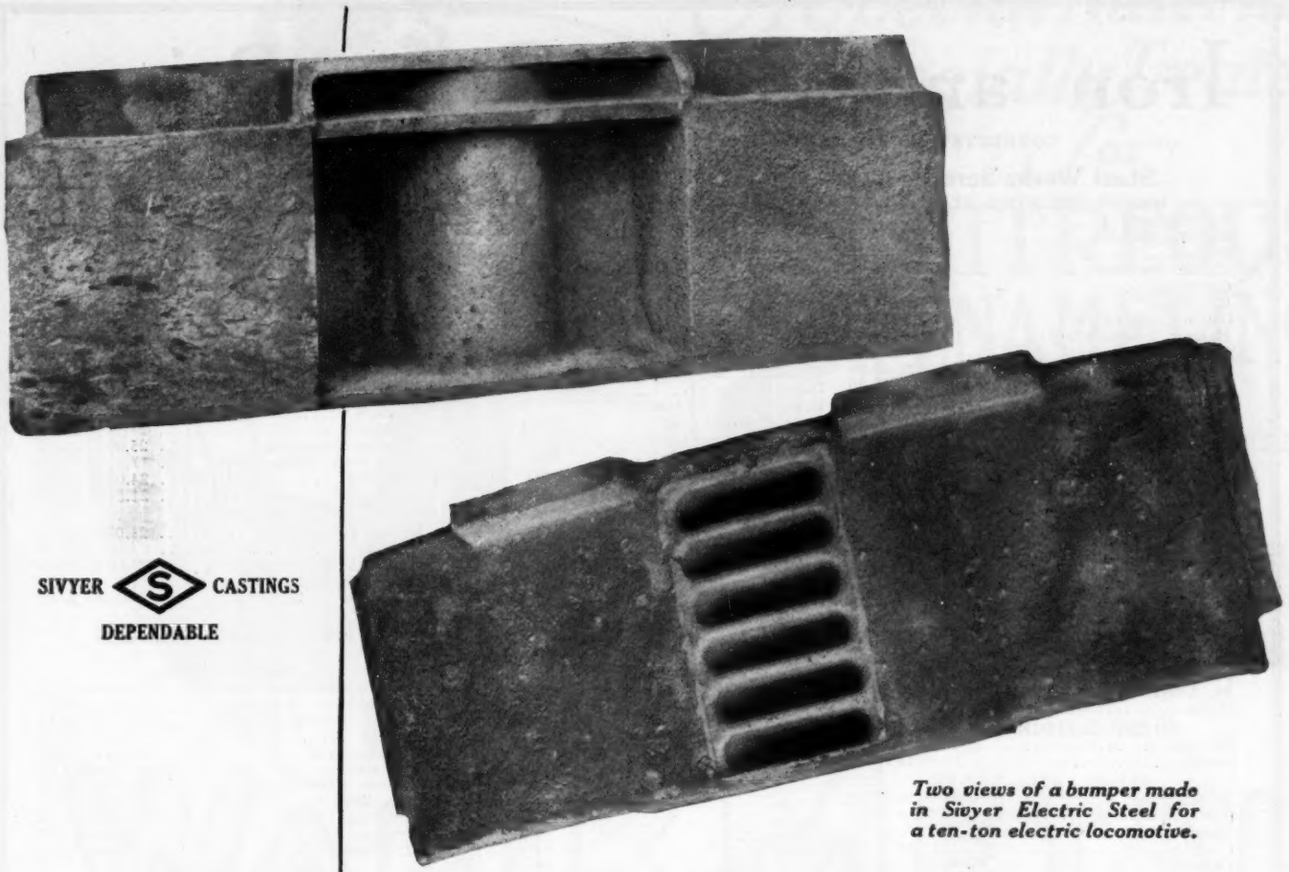
Outside diameter	Net prices per foot f.o.b. Pittsburgh Gage	Price
2-inch	12-gage	15c
2-inch	12-gage	15c
2-inch	11-gage	16c
2-inch	10-gage	17c
2¼-inch	12-gage	17c
2¼-inch	11-gage	18c
2¼-inch	10-gage	20c
3-inch	7-gage	35c
1½-inch	9-gage	15c
5⅜-inch	9-gage	55c
5½-inch	9-gage	57c

Plus usual extras for forming and for long lengths.

Hot Rolled Alloy Steels

Prices per pound, Pittsburgh

S. A. E. Series—
2300 (3½ per cent nickel)..... 5.00 to 5.25c
3100 (nickel chromium)..... 4.00 to 4.25c
6100 (chrome vanadium)..... 5.00c
6100 (chrome vanadium spring) 4.75c
9250 (Silico manganese spring) 3.90c



Two views of a bumper made in Sivyer Electric Steel for a ten-ton electric locomotive.

SIVYER CASTINGS
DEPENDABLE

Bearing the Brunt of the Hardest Knocks

THE locomotive bumper shown above illustrates how manufacturers of mining machinery are turning to Sivyer Steel even in the simple cases where the only unusual requirement is unusual strength. The manufacturer using this bumper casting originally came to Sivyer because his machining costs were high for certain parts. Sivyer methods solved the many problems involved and gave him uniformly machinable castings. In service they demonstrated such exceptional durability and resistance to wear that he now uses Sivyer Electric Steel for the sake of its superior strength qualities as well as for the sake of keeping down production costs.

Send Blue Prints

If certain parts of your product—which are now either cast or hammer-forged and welded—ought to be more effectively safeguarded against failure in service, send us your blue prints with an explanation of your difficulties. We will be glad to study the problems involved and recommend possible solutions without obligation on your part.

If some of your planing and boring tools require an unusual amount of grinding and replacement, it may be that there are sand and slag on the surface of some of the castings now used. Tools are keen inspectors of castings and originate many of the orders that come to Sivyer from more than a thousand miles away. If your usual sources of supply seem unable to get rid of the trouble, send us your blue prints of the parts in question, together with details about your difficulties. Without obligation on your part we will study the problems of molding practice involved and suggest methods for producing castings with uniformly good machining quality.

SIVYER STEEL

SIVYER STEEL CASTING COMPANY, MILWAUKEE

Iron and Steel Scrap Prices

CORRECTED TO TUESDAY NOON GROSS TONS DELIVERED TO CONSUMER

Steel Works Scrap

HEAVY MELTING STEEL

Birmingham	14.00 to 14.50
Boston (dealers)	15.00 to 16.00
Buffalo	20.50 to 21.00
Chicago	18.50 to 19.00
Cleveland	19.50 to 20.00
Cincinnati	17.50 to 18.00
Detroit (dealers)	17.50 to 18.00
Eastern Pennsylvania	18.00 to 19.00
New York (dealers)	13.50 to 14.00
Pittsburgh	22.50 to 23.00
St. Louis	17.00 to 17.50
Valleys	21.50 to 22.00
No. 1 railroad steel New York (dealers)	14.25 to 14.75

COMPRESSED SHEETS

Buffalo	18.50 to 19.00
Chicago	14.50 to 15.00
Cleveland	17.25 to 17.50
Detroit (dealers)	16.00 to 16.50
Pittsburgh	20.50 to 21.00
Valley	19.00 to 19.50

BUNDLED SHEETS

Buffalo	13.00 to 13.50
Cincinnati	13.00 to 13.50
Cleveland	14.00 to 14.25
Detroit	12.50 to 13.00
Eastern Pennsylvania	15.50 to 16.00
Pittsburgh	18.50 to 19.00
St. Louis	10.50 to 11.00
Valley	16.25 to 16.50

SHEET CLIPPINGS, LOOSE

Chicago	11.50 to 12.00
Detroit	11.50 to 12.00

STEEL RAILS, SHORT

Birmingham	12.00 to 13.00
Boston (dealers)	15.00 to 16.00
Chicago	20.50 to 21.00
Cincinnati	21.00 to 21.50
Cleveland	18.00 to 18.50
St. Louis	20.00 to 20.50

STOVE PLATE

Birmingham	17.00 to 17.50
Boston (consumers)	16.50 to 17.00
Buffalo	18.00 to 18.50
Pittsburgh	16.00 to 16.50
Chicago	20.50 to 21.00
Cincinnati (net iron)	13.50 to 14.00
Cleveland	19.25 to 19.50
Detroit (net ton) (dealers)	14.50 to 15.00
Eastern Pennsylvania	17.00 to 17.50
New York (dealers)	13.00 to 14.00
Pittsburgh	17.00 to 17.50
St. Louis	18.50 to 19.00

LOW PHOSPHORUS

Buffalo	22.50 to 23.00
Cincinnati	17.50 to 18.00
Eastern Pennsylvania	21.00 to 22.00
Pitts., billets and bloom crops	24.50 to 25.50

SHOVELING STEEL

Chicago	18.25 to 18.75
Pittsburgh	17.50 to 18.00
St. Louis	17.00 to 17.50

KNUCKLES, COUPLERS, SPRINGS

Chicago	21.00 to 21.50
Eastern Pennsylvania	23.00 to 23.50
Pittsburgh	24.00 to 24.50
St. Louis	20.50 to 21.00

FROGS, SWITCHES, GUARDS

Chicago	18.50 to 19.00
Eastern Pennsylvania	18.00 to 19.00
St. Louis	18.25 to 18.75

BOILER PLATE, CUT

St. Louis	11.75 to 12.25

ANGLE BARS—STEEL

Chicago	19.75 to 20.25
St. Louis	18.00 to 18.50

Iron Mill Scrap

RAILROAD WROUGHT

Birmingham	12.00 to 13.00
Boston dealers)	14.50 to 15.00
Buffalo	16.50 to 17.00
Cleveland, No. 1	17.00 to 17.25
Chicago, No. 1	18.50 to 19.00
Chicago, No. 2	18.50 to 19.00
Cincinnati No. 1	14.50 to 15.00
Detroit, No. 2	17.50 to 18.00
Eastern Pennsylvania	20.00 to 21.00
New York, No. 1 (dealers)	14.75 to 15.25
Pittsburgh, No. 1	17.50 to 18.00
Pittsburgh, No. 2	22.50 to 23.00
St. Louis, No. 1	16.50 to 17.00
St. Louis, No. 2	17.00 to 17.50

WROUGHT PIPE

Boston (dealers)	12.50 to 13.00
Buffalo	13.50 to 14.00
Eastern Pennsylvania	18.00 to 19.00
New York (dealers)	12.75 to 13.25

YARD WROUGHT

Boston	12.00 to 13.00
Eastern Pennsylvania	19.50 to 20.00

CITY WROUGHT

New York, long	14.50 to 15.00

BUSHELING

Buffalo	18.50 to 19.00
Chicago, No. 1	15.75 to 16.25
Chicago, No. 2	10.00 to 10.50
Cincinnati, No. 1	13.50 to 14.00
Cleveland, No. 1	14.50 to 15.00
Cleveland, No. 2	12.50 to 12.75
Detroit, No. 1	13.00 to 13.50
Detroit, No. 2 (new)	14.00 to 14.50
Detroit, No. 2 (old)	10.50 to 11.00
Eastern Pennsylvania	16.00 to 17.00
Pittsburgh, No. 1	18.50 to 19.00
St. Louis, No. 1	16.50 to 17.00

MACHINE SHOP TURNINGS

Birmingham	6.00 to 7.00
Boston (dealers)	10.50 to 11.00
Buffalo	14.00 to 14.50
Chicago	11.50 to 12.00
Cincinnati	11.50 to 12.00
Cleveland	15.50 to 15.75
Detroit (dealers)	12.50 to 13.00
Eastern Pennsylvania	15.50 to 16.00
New York (dealers)	10.50 to 11.00
Pittsburgh	16.00 to 16.50
St. Louis	10.00 to 10.50
Valleys	15.00 to 15.25

CAST IRON BORINGS

Birmingham (chemical)	16.00 to 17.00
Birmingham (plain)	8.00 to 9.00
Boston (chemical)	12.00 to 12.50
Boston (dealers)	10.50 to 11.00
Buffalo	14.50 to 15.00
Chicago	13.75 to 14.25
Cincinnati	13.00 to 13.50
Cleveland	16.50 to 17.00
Detroit (dealers)	12.75 to 13.25
Eastern Pennsylvania (chem.)	15.50 to 16.00
Eastern Pennsylvania	15.00 to 16.00
New York (dealers' price)	10.50 to 11.00
Pittsburgh	17.50 to 18.00
St. Louis	14.00 to 14.50
Valleys	16.25 to 16.75

MIXED BORINGS AND TURNINGS (For blast furnace use)

Boston (dealers)	10.50 to 11.00
Cleveland	16.25 to 16.50
Detroit (dealers)	12.50 to 13.00
Eastern Pennsylvania	12.50 to 13.00
New York (dealers)	9.50 to 10.00

IRON AXLES

Birmingham	21.00 to 22.00
Boston (consumers)	31.00 to 32.00
Buffalo	28.00
Chicago	29.50 to 30.00
Cincinnati	24.00 to 25.00
Eastern Pennsylvania	26.00 to 30.00
New York (dealers)	25.75 to 26.25
St. Louis	28.50 to 29.00

IRON RAILS

Buffalo	20.00 to 21.00
Chicago	21.00 to 21.50
Cincinnati	16.50 to 17.00
St. Louis	17.50 to 18.00

PIPES AND FLUES

Chicago	13.25 to 13.75
Cincinnati	11.00 to 12.00
Cleveland	15.00 to 15.50
St. Louis	13.75 to 14.25

RAILROAD GRATE BARS

Buffalo	17.50 to 18.00
Chicago	18.75 to 19.25
Cleveland	19.00 to 19.50
Eastern Pennsylvania	17.50 to 18.50
New York (dealers)	14.25 to 14.75
St. Louis	17.50 to 18.00

FORGE FLASHINGS

Boston (dealers)	10.50 to 11.00
Chicago, small	13.00 to 13.50
Cleveland, small	14.25 to 14.75
Cleveland, large	13.75 to 14.25
Detroit (dealers)	12.50 to 13.00

FORGE SCRAP

Boston (dealers)	10.00 to 10.50
Chicago	18.25 to 19.00
Eastern Pennsylvania	15.50 to 16.00

ARCH BARS AND TRANSOMS

Chicago	23.00 to 23.50
St. Louis	23.50 to 24.00

ANGLE BARS—IRON

Chicago	23.00 to 23.50
St. Louis	24.00 to 24.50

Iron and Steel Works Scrap

AXLE TURNINGS

Boston (dealers)	10.50 to 11.00
Buffalo	15.00 to 15.50
Chicago	16.00 to 16.50
Cleveland	16.25 to 16.75
Eastern Pennsylvania	16.00 to 16.50
Pittsburgh	18.50 to 19.00
St. Louis	14.00 to 14.50

STEEL CAR AXLES

Birmingham	19.00 to 20.00
Boston (consumers)	20.00 to 21.00
Buffalo	21.00 to 22.00
Chicago	21.50 to 22.00
Cleveland	21.50 to 23.00
Eastern Pennsylvania	25.00 to 26.00
New York (dealers)	17.00 to 17.50
Pittsburgh	24.00 to 25.00
St. Louis	21.50 to 22.00

SHAFTING

Boston (consumers)	21.00 to 22.00
Chicago	24.00 to 24.50
Eastern Pennsylvania	23.00 to 25.00
New York (dealers)	15.75 to 16.25
St. Louis	20.50 to 21.00

Iron Foundry Scrap

CAR WHEELS

Birmingham, tram car	18.00 to 19.00
Birmingham, iron	13.00 to 14.00
Boston (consumers)6	20.00 to 20.50
Buffalo	20.00 to 20.50
Chicago, iron	21.50 to 22.00
Cincinnati	15.50 to 16.00
Eastern Pennsylvania	19.50 to 20.50
New York iron (dealers)	15.50 to 16.00
Pittsburgh, iron	21.00 to 21.50
Pittsburgh, steel	24.00 to 24.50
St. Louis, iron	19.00 to 19.50

NO. 1 CAST SCRAP

Birmingham, cupola	19.50 to 20.00
Boston (consumers)	22.50 to 23.00
Buffalo	20.00 to 20.50
Chicago, cupola	22.50 to 23.00
Cincinnati No. 1 machinery cupola (net tons)	21.00 to 22.00
Cleveland, cupola	21.50 to 22.50
Detroit (net tons) (dealers)	18.00 to 18.50
Eastern Pennsylvania, cupola	20.50 to 21.50
New York, cupola (dealers)	17.25 to 17.75
Pittsburgh, cupola	21.50 to 22.00
San Francisco	25.00 to 26.00
St. Louis, railroad	21.00 to 21.50
St. Louis, agricultural	21.00 to 21.50
Valleys	22.00 to 23.00

HEAVY CAST

Boston (consumers)	19.50 to 20.00
Buffalo (breakable)	17.00 to 17.50
Cleveland	17.00 to 17.25
Detroit (automobile) (net ton)	22.50 to 23.00
Eastern Pennsylvania	18.50 to 19.00
New York (dealers)	16.75 to 17.25
Pittsburgh	19.50 to 20.00

MALLEABLE

Boston (railroad)	20.00 to 21.00
Buffalo	20.50 to 21.00
Chicago, railroad	21.50 to 22.00
Chicago, agricultural	20.50 to 21.50
Cincinnati, agricultural	17.00 to 17.50
Cincinnati, railroad	17.00 to 17.50
Cleveland, agricultural	20.00 to 20.50
Cleveland, railroad	21.00 to 21.25
Detroit (dealers)	18.00 to 18.50
Eastern Pennsylvania, railroad	17.00 to 18.00
Pittsburgh, railroad	19.50 to 20.00
St. Louis, agricultural	18.50 to 19.00
St. Louis, railroad	18.75 to 19.25

Miscellaneous Scrap

RAILS FOR ROLLING 5 feet and over

Birmingham	15.00 to 15.50
Boston (dealers)	16.00 to 16.25
Chicago	20.00 to 20.50
Cleveland	19.50 to 20.00
Detroit	17.50 to 18.00
Eastern Pennsylvania	19.00 to 20.00
New York (dealers)	16.25 to 16.75
Pittsburgh district	23.00 to 23.50
St. Louis	19.00 to 19.50

LOCOMOTIVE TIRES

Chicago	20.00 to 21.00
St. Louis	18.00 to 18.50

LOW PHOSPHORUS PUNCHINGS

Chicago	19.50 to 20.00
Eastern Pennsylvania	22.00 to 23.00
Pittsburgh	24.00 to 24.50

A Special Material Specially Treated for

VITREOUS ENAMELING

STOVE DOOR PANELS
SPLASHER BACKS
BROILER PANS
TABLE TOPS
REFRIGERATORS
SIGNS
and other flat work

WABIK METAL

Like all other Mansfield Products, WABIK METAL SHEETS are rolled from our own special "BOTTOM-POURED" INGOTS.

SHEET BARS INGOTS

Other Specialties:—

AUTOMOBILE SHEETS

Body Stock; Flat Fender and Hood Stock; Cowl Stock; Radiator Casing Stock; Crown Fender Stock.

METAL FURNITURE SHEETS

PICKLED and ANNEALED ENAMELING STOCK
For Kitchen Utensils

MILK CAN STOCK

ELECTRICAL SHEETS

"Mansfield" Steel is the ultimate in Sheet Bars and in Sheets. It means satisfaction to the many users. Constant study of the needs of users, and continuous application of the results of such study, in the way of improved methods in our plants has established a reputation for reliability unsurpassed.

Mansfield Sheet & Tin Plate Company

MANSFIELD, OHIO

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Iron and Steel Production

Compiled By IRON TRADE REVIEW

Pig Iron

	-Stacks- No.	In	—Output— Total	Av. daily
1907				
January	376	311	2,174,801	70,155
February	374	308	2,047,036	73,109
March	377	304	2,186,709	70,539
April	378	327	2,226,708	74,223
May	391	329	2,291,030	73,904
June	392	341	2,237,420	74,580
July	396	335	2,253,243	72,685
August	397	329	2,243,656	72,376
September	399	329	2,174,148	72,471
October	401	314	2,359,690	76,119
November	398	226	1,820,558	60,685
December	398	154	1,234,733	39,830
Total			25,249,732	
1908				
January	398	139	1,081,813	34,897
February	401	150	1,086,809	37,476
March	398	154	1,229,856	39,672
April	398	146	1,155,122	38,504
May	396	145	1,168,002	37,677
June	395	154	1,106,300	36,876
July	397	166	1,228,604	39,632
August	399	181	1,366,019	44,065
September	399	189	1,416,252	47,208
October	400	200	1,573,824	50,764
November	402	212	1,582,314	52,744
December	403	221	1,723,664	55,602
Total			15,718,579	
1909				
January	406	234	1,787,473	57,683
February	407	233	1,682,470	60,088
March	406	229	1,822,024	58,793
April	406	224	1,731,406	57,687
May	407	236	1,866,757	60,218
June	408	240	1,929,929	64,334
July	409	258	2,088,620	67,375
August	412	278	2,232,642	72,021
September	413	297	2,378,655	79,201
October	413	309	2,589,681	83,538
November	414	311	2,532,740	84,425
December	416	314	2,682,702	86,539
Total			25,325,099	
1910				
January	416	311	2,599,995	83,871
February	417	311	2,429,525	86,768
March	417	310	2,588,736	83,508
April	418	291	2,477,700	82,590
May	419	279	2,374,802	76,607
June	420	271	2,288,279	76,276
July	420	254	2,158,124	69,617
August	422	244	2,103,791	67,864
September	420	234	2,048,461	68,282
October	421	230	2,086,205	67,297
November	421	218	1,910,385	63,679
December	421	193	1,779,899	57,416
Total			26,845,902	
1911				
January	421	210	1,766,658	56,985
February	421	226	1,781,285	63,617
March	421	236	2,165,764	69,863
April	421	220	2,044,904	68,163
May	421	206	1,871,888	60,367
June	421	202	1,773,282	59,109
July	423	196	1,776,108	57,294
August	423	206	1,921,832	61,995
September	423	216	1,973,918	65,797
October	421	214	2,092,061	67,486
November	421	214	1,999,100	66,637
December	422	215	2,032,301	65,558
Total			23,198,601	
1912				
January	421	227	2,052,806	66,220
February	422	235	2,098,796	72,372
March	420	237	2,411,529	77,791
April	421	239	2,377,621	79,254
May	423	243	2,503,341	80,753
June	424	242	2,433,737	81,125
July	422	245	2,402,567	77,502
August	423	255	2,500,163	80,650
September	419	262	2,444,454	81,482
October	422	280	2,683,645	86,569
November	423	289	2,639,562	87,985
December	423	291	2,777,292	89,590
Total			29,325,513	
1913				
January	423	297	2,787,800	89,929
February	423	306	2,578,670	92,095
March	423	278	2,762,823	89,123
April	421	297	2,754,353	91,812
May	421	285	2,816,825	90,865
June	422	283	2,616,883	87,229
July	422	264	2,558,275	82,525
August	424	260	2,537,018	81,839
September	425	258	2,494,098	83,137
October	425	244	2,539,924	81,933
November	424	225	2,229,960	74,322
December	424	191	1,976,138	63,746
Total			30,652,767	
1914				
January	423	199	1,879,336	60,624
February	423	219	1,888,607	67,450
March	423	232	2,341,551	75,534
April	422	212	2,261,501	75,383
May	422	198	2,097,019	67,646
June	422	193	1,904,566	63,486
July	422	187	1,955,324	63,075
August	422	187	1,996,483	64,403
September	422	180	1,882,718	62,757
October	422	162	1,767,227	57,007
November	421	150	1,501,269	50,042
December	421	154	1,495,325	48,236
Total			22,970,926	
1915				
January	421	165	1,591,024	51,323
February	421	179	1,666,592	59,521
March	421	190	2,046,280	66,009
April	421	197	2,114,518	70,484
May	421	207	2,255,157	72,747
June	421	221	2,369,932	78,998
July	421	234	2,563,311	82,687
August	421	246	2,774,825	89,510
September	420	266	2,834,342	94,478
October	420	276	3,120,340	100,656
November	421	285	3,035,235	101,174
December	421	295	3,201,605	103,278
Total			29,573,161	
1916				
January	421	304	3,171,878	102,319
February	421	312	3,078,548	106,157
March	422	315	3,327,630	107,343
April	422	320	3,225,496	107,517
May	423	321	3,364,584	108,535
June	423	325	3,213,818	107,127
July	419	316	3,221,127	103,907
August	419	317	3,197,838	103,156
September	419	326	3,208,041	106,935
October	419	328	3,508,180	113,167
November	420	322	3,317,805	110,593
December	422	309	3,184,178	102,715
Total			39,019,123	
1917				
January	422	310	3,159,839	101,930
February	422	317	2,649,935	94,641
March	423	331	3,255,813	105,026
April	425	333	3,328,061	110,936
May	425	340	3,413,677	110,119
June	427	347	3,260,234	108,675
July	429	351	3,337,442	107,659
August	431	357	3,238,970	104,483
September	431	342	3,140,742	104,691
October	433	354	3,296,286	106,332
November	434	344	3,198,597	106,620
December	435	321	2,885,380	93,077
Total			38,164,976	
1918				
January	435	294	2,403,227	77,523
February	435	319	2,318,242	82,723
March	438	338	3,209,996	103,548
April	437	351	3,273,355	109,112
May	437	360	3,451,884	111,351
June	437	353	3,316,148	110,538
July	437	364	3,408,584	109,954
August	439	371	3,378,479	108,983
September	438	364	3,413,223	113,774
October	437	364	3,482,392	112,335
November	437	360	3,347,844	111,595
December	435	351	3,434,114	110,778
Total			38,437,488	
1919				
January	435	330	3,306,279	106,654
February	435	311	2,943,347	105,120
March	435	279	3,088,023	99,614
April	435	216	2,474,374	82,479
May	433	197	2,107,729	67,991
June	433	199	2,114,028	70,467
July	434	240	2,424,212	78,200
August	432	266	2,742,081	88,453
September	433	163	2,480,790	82,692
October	432	216	1,864,424	60,142
November	432	252	2,407,369	80,244
December	432	262	2,626,074	84,711
Total			30,578,780	
1920				
January	432	285	3,012,373	97,172
February	432	305	2,984,257	102,904
March	433	315	3,375,768	108,895
April	433	278	2,752,670	91,754
May	433	297	2,991,825	96,510
June	433	302	3,046,623	101,553
July	434	291	3,043,918	98,190
August	434	306	3,145,536	101,468
September	434	317	3,124,308	104,143
October	435	290	3,288,341	106,075
November	435	255	2,935,081	97,836
December	435	202	2,700,268	87,105
Total			36,400,968	
1921				
January	436	184	2,414,753	77,895
February	436	155	1,929,394	68,906
March	436	103	1,594,866	51,447
April	436	96	1,190,751	39,691
May	436	90	1,215,272	39,202
June	436	74	1,064,007	35,466
July	435	69	864,642	27,892
August	436	69	954,901	30,802
September	435	84	985,795	32,859
October	435	95	1,234,450	39,821
November	429	120	1,414,958	47,165
December	429	123	1,642,775	52,992
Total			16,506,564	
1922				
January	430	127	1,645,804	53,090
February	429	139	1,630,180	58,220
March	429	155	2,035,908	65,674
April	429	161	2,070,161	69,005
May	427	175	2,309,348	74,495
June	427	191	2,362,455	78,748
July	427	170	2,403,030	77,517
August	427	143	1,810,665	58,408
September	427	189	2,024,008	67,466
October	428	218	2,629,655	84,827
November	428	241	2,846,110	94,870
December	428	253	3,083,520	99,468
Total			26,850,844	
1923				
January	428	261	3,228,226	104,136
February	424	278	2,993,918	106,925
March	424	295	3,523,595	113,664
April	423	311	3,547,012	118,233
May	423	322	3,868,486	124,790
June	424	322	3,667,868	122,262
July	418	299	3,684,677	118,860
August	418	270	3,448,886	111,254
September	418	254	3,117,526	103,917
October	418	245	3,142,642	101,375
November	418	229	2,891,191	96,373
December	418	231	2,912,527	93,952
Total			40,025,850	

Monthly Ingot Output

Gross Tons

1922	84.15 per cent of capacity	Calculated total
January	1,593,482	1,891,857
February	1,745,022	2,071,772
March	2,370,751	2,814,667
April	2,444,513	2,902,240
May	2,711,141	3,218,794
June	2,634,477	3,127,775
July	2,487,104	2,952,806
August	2,214,582	2,629,256
September	2,373,779	2,818,261
October	2,872,415	3,410,265
November	2,889,297	3,430,309
December	2,779,890	3,300,416
Total	29,116,453	34,568,418
1923	**95.35 per cent**	
January	3,644,629	3,822,369
February	3,294,264	3,454,918
March	3,858,675	4,046,854
April	3,760,997	3,944,412
May	4,000,695	4,195,800
June	3,574,567	3,748,890
July	3,350,829	3,514,241
August	3,506,755	3,677,771
September	3,161,964	3,316,166
October	3,382,986	3,547,966
November	2,969,012	3,113,804
December	2,711,529	2,843,764
Total	41,216,902	43,226,955